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Aluminum-Coated Steel
Conditioning Alabama Iron Ores
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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120 NO. 12 MARCH 24, 1947

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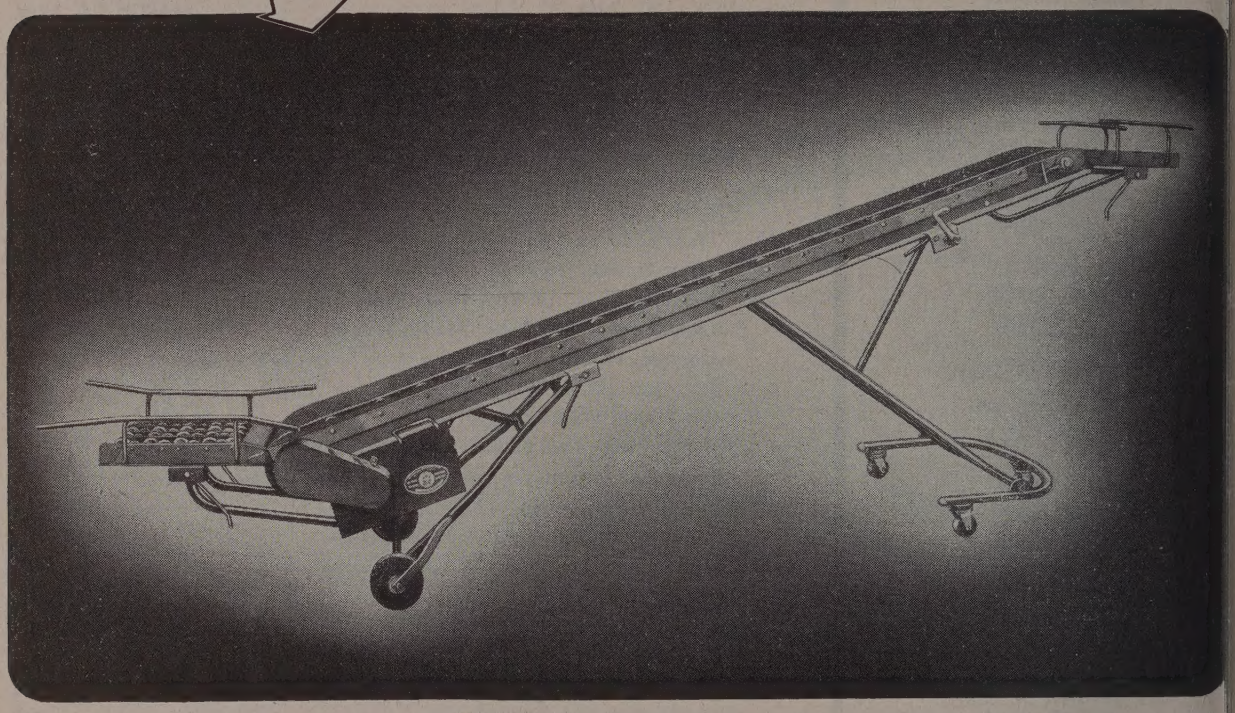

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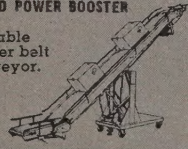

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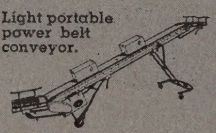

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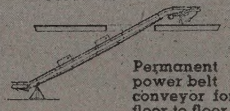

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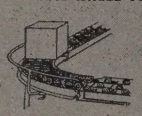

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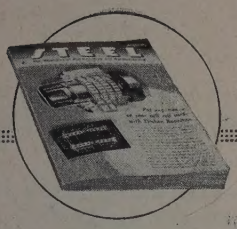


March 24, 1947

Psychology and Prices

Many industrialists are concerned over the present trend in domestic prices. At the turn of the year there were indications that prices were leveling off. In the last week of December and in the first and third weeks of January the index of commodity prices in primary markets compiled by the Bureau of Labor Statistics showed slight declines. In the week ended Feb. 1, the index remained unchanged from the previous week.

On the basis of these four faint signs, some observers became hopeful that a reversal in price trends was near at hand. Subsequent events have dashed these hopes. Since the week ending Feb. 1, the index has risen steadily from 140.3 to 148.7 and no signs of a leveling off are apparent.

This persistent rise so long after price controls went off is disconcerting. Many industrialists are beginning to realize that the longer the reversal of trend in prices is postponed, the more severe will be the economic adjustment that must follow.

It is for this reason that every producer, fabricator, distributor, manufacturer and consumer, as well as salaried and wage-earning individuals, should welcome every effort that is made to start a downward price movement.

To date a few noteworthy steps in this direction have been taken. Ford Motor announced a reduction in automobile prices. International Harvester reduced prices on certain products with this significant explanation: Harvester reduced prices "not because we were meeting with buyer resistance, nor because of the present competitive situation, but with the object of giving our customers the benefit of lower prices at a psychological moment and because we believe there is nothing more important in this country today than to lower the prices of goods that people desire to buy."

Pullman-Standard Car Mfg. Co. announces that prices of box cars have come down from an average of $4000 to $4300 in 1946 to a present figure of $3600, due reportedly to a larger degree of standardization in parts. Carnegie-Illinois Steel has revised its recently adopted extra cards—a move which, if followed by other steel producers, will mean a substantial reduction in the prices consumers pay for steel.

Pullman-Standard and Carnegie-Illinois attribute their reductions to technological factors and not to the psychological and economic considerations avowed by Ford and International Harvester. However, the end results are identical, and the more of price reduction that comes out in the near future, the better off will be our economy six months from now.

* * *

TIME FOR DECISION: One of the most complete about-face performances of recent times is found in the present attitude toward communists as contrasted to the attitude in the hey-day of the New Deal.

When Roosevelts, Wallaces and Peppers were riding high, wide and handsome, it was fashionable to hob-nob with fellow travelers, to ridicule the Dies committee and to shout "red-baiter" at any person who ventured to criticize communists. Today President Truman has just proposed aid for Greece and Turkey for the avowed purpose of checking the expansion of communism. Secretary of Labor Schwellenbach has urged Congress to outlaw the communist party in the United States. The Supreme Court has ruled that a communist can be fired from government service. Labor union leaders are making a real effort to purge their organizations of communists. The House Un-American Activities Committee will hold hearings in May to find out how far Congress can go, under the Constitution and Bill of Rights, to outlaw "undesirable organizations."

It will be well to air this question thoroughly. We should decide whether or not our pledge to pro-

(OVER)

tect the rights and freedoms of individuals requires us to harbor and befriend persons subject to commands from abroad who openly admit that one of their objects is the overthrow of our form of government by "boring from within" or by outright revolution. —p. 52

• • •

DWINDLING RESERVES: At the World Conference on Mineral Resources held in New York last week, Secretary of Interior J. A. Krug outlined the present status of mineral resources in the United States.

Minerals in abundant supply, he said, include magnesium, nitrogen, bituminous coal and lignite, rock salt, phosphate rock and molybdenum. Iron and aluminum possibly should be included, because low-grade deposits are abundant. In the category of minerals that are entirely lacking, he cited tin, nickel, platinum, industrial diamonds, flake graphite and quartz crystals. In a third classification, consisting of minerals once abundant but now becoming depleted, he listed copper, lead, zinc, antimony, tungsten, manganese, vanadium, chromium, mercury, gold, silver, fluorspar, bauxite and possibly petroleum.

The list of minerals that are lacking or being depleted is impressive. In the present confused state of the postwar world, we cannot afford to be complacent regarding the mineral reserves remaining within our borders. —p. 46

• • •

BREAK THIS DEADLOCK: Recently June 30, 1948 was set as the date for winding up the affairs of WAA. On the basis of information now available, it is doubtful whether the agency can dispose of its large inventory of government-owned machine tools by that deadline unless sales can be stepped up sharply.

Machine Tool Advisory Committee has proposed several measures for speeding disposal. One is to eliminate the Clayton formula and sell all machines on a fixed price basis. Another is to sell machine tools to schools at fixed nominal prices.

Another complicating factor is the reluctance of Army and Navy officials to say how many machines shall be stored for military emergency until after Congress has decided upon Army and Navy appropriations. The number of machine tools that properly can be broken up for scrap also seems to be in doubt.

Obviously, the present deadlock calls for prompt decisions on major policy. The sooner these can be made, the better for all concerned. —p. 50

SIGNS OF THE TIMES: Potential market for air conditioning equipment for the five years starting with 1947 is estimated at $1 billion. The industry will require 135,000 tons of finished steel products this year (p. 56), plus substantial tonnages of castings, forgings and nonferrous metals, particularly copper and aluminum. . . . Death of William C. Durant last week stirred recollections in motordom and Wall Street (p. 59) of the financial wizardry of the man who organized General Motors in 1908 and lost control of it twice in the succeeding 12 years. . . . Ordinarily machine tool builders go to great lengths to eliminate vibration from their products. However, there are times when vibration can be put to useful work. Machine Tool Editor Guy Hubbard cites two instances (p. 76) where electromagnetic vibrators are employed to jolt material in feed or ejection troughs so that it "inches" its way to the desired destination. . . . Belgian and Luxemburgian steelmakers are making progress in restoring their export trade. In 1946 iron and steel exports totaled 1,500,000 metric tons (p. 55). . . . In fabricating 30-in. pipe for a high-pressure gas line in California, Consolidated Steel Corp. subjects each welded cylinder to a hydraulic pressure of 5200 psi (p. 74) which expands the pipe to the dimensions of heavy cylindrical dies. This expansion involves cold working of the metal which increases its yield strength. It also insures maximum roundness and straightness of the pipe section and tests the welded longitudinal seams. . . . Higher rates of production of steel and automobiles have lifted this publication's index of industrial production to a preliminary figure of 161 (p. 64) which, if sustained by final figures, will constitute a new postwar high. . . . President Truman has appointed a committee, headed by K. T. Keller, president of Chrysler, to investigate and report (p. 52) "as to the number and types of merchant vessels to be constructed annually under a long-range program". . . . Speaking at the annual meeting of the American Institute of Mining and Metallurgical Engineers, Charles M. White, president of Republic Steel, warned (p. 46) that much of the American steel industry eventually might be forced to migrate from the lower lake region of the Middlewest to the eastern seaboard or to the Gulf states to utilize imported ores if methods are not developed to utilize the low grade ores of the lake region.

E. L. Shaner

EDITOR-IN-CHIEF

SCANNED

STEEL
March
24
1947

New Extra Revisions Lower Steel Price Level

Adjustments by leading producer aimed at eliminating inequities in cards announced in December and January and are designed to simplify extra structure. Reductions range up to $10 a ton on some items

STEEL price reductions, ranging up to 0 a ton depending upon the specifica-n, were effected March 19 by Carnegie-inois Steel Corp. through a new revi-n in extra charges.

The price adjustments are expected to followed by other steel producers. Re-sions involve changes for carbon plates, apes, merchant and reinforcing bars, hot d cold-rolled sheets, vitrenamel sheets, ng ternes, hot rolled-strip, alloy bars and mifinished, and forging and rerolling ality semifinished carbon steel.

Changes include upward as well as wnward revisions, but in the aggregate sult in price reductions. They affect tras applicable for chemical require-ents, treatment, cutting, thickness and her size specifications, and are designed more accurately reflect present produc-n costs and to achieve simplification d greater uniformity in application of e extras among the various steel prod-ts.

Some observers believed that since the ice action comes so soon after general visions of December and January, there a hint that first-quarter steel earnings ll make pleasant reading. It also is inted out that considerable pressure is ing exerted on industry to follow the d of Ford Motor Co. and International rvester Co. in reducing prices to help m the inflationary price spiral. Such move, it is pointed out, would have a derating effect on current wage nego-tions.

Whether or not the latest revision in tra charges eliminates all the inequities impossible to determine at this time, t it is not unlikely that extras on other ducts will come in for review soon.

Most significant revisions in extra ad-tments involve carbon bars and plates. Merchant bar quality bar is now limited sizes under 3-in. for rounds, squares d hexagons, and other standard bar es under 40.8 lb per foot. Sizes 3-in. d over must take the special bar qual-extra of 15 cents per 100 lb. Regard-s of size, all steel with specified silicon ntent, or specified as killed steel, or fine grain, or resulphurized, must take the special bar quality extra. Silicon extras have been reduced $2 per ton across the board, which means in case of high carbon or large sizes there is no extra for silicon.

Substantial reduction in size extras for rounds, squares and round cornered squares has been put into effect through establishment of a base size for the range 1½ to 1 15/16-in. This results in a reduction of $3 a ton for the base size. In place of the 15 cents extra for size range 47/64 to 2½-in. the following new size ranges with corresponding extras have been substituted: ¾ to 31/32-in., 15 cents; 1 to 1 15/32-in., 10 cents; 1½ to 1 15/16-in., base; 1 31/32 to 2½-in., 10 cents. There were no revisions in size extras for the larger dimensions, but advances of $1 to $2 a ton for smaller sizes were established as follows: Increase of 10 cents per 100 lb to $1.30 for ¼-in., to $1.10 for 9/32-in. and 95 cents for 5/16-in. Size ranges from 11/32 to 23/32-in. are up 5 cents.

Greater liberalization of opportunity has been afforded carbon bar consumers to avoid payment of specified dead length extras in that they are not required to accept extreme odd sizes in ordering to random lengths. Special and precision machine cutting extras are now grouped under the one heading with separate extras applicable for cutting one or both ends of 15 and 20 cents respectively for lengths 35 ft and over; with gradual increase in extras for shorter lengths. Standard cutting extra for length of 45 ft or over has been reduced from $1.50 to 75 cents; for 40 to 45 ft, exclusive, from $1 to 60 cents; and 5 to 10 ft, exclusive, from 20 to 5 cents.

Normalizing and stress relieving extra for carbon bars has been reduced from 75 to 50 cents and annealing (no specified structure) from 90 to 75 cents; a reduction of $5 and $3 per ton, respectively. A slight revision in chemical requirement extras has been made, with the carbon extra for over .28 to .65, exclusive, (basic open hearth or acid bessemer) advanced to 10 cents. Bundling and lift weights extras have been more clearly expressed in the new extra card in order to prevent further confusion as to when such extras are applicable; amount of these extras has not been revised.

Carbon Plate Extras Revised

Revision in carbon plate extras results in savings to consumers in excess of $10 per ton on some special specifications; reduction in classification extras alone afford savings of $1 to $4, depending on the specification. Details of extra revisions in the plate card follow:

The 10 cents per 100 lb classification extra for plates subject to ladle chemistry only has been eliminated; this revision affects practically every plate order. Extra for plates subject to physical requirements (melt test) only has been changed from 10 to 5 cents; and the 20-cents extra for plates subject to ladle chemistry (carbon and/or manganese, phosphorus, and sulphur) and physical requirements (melt

BOX CAR PRICES CUT

By using its own shop facilities to greater degree than previously, Pullman-Standard Car Mfg. Co. is now able to quote lower prices on new freight cars. The company plans to fabricate in its own shops many of the car parts previously purchased from other manufacturers, according to Champ Carry, president. The savings will be passed on to the railroads.

Most railroad cars are purchased on a competitive bid basis with the roads usually specifying particular types and makes of equipment and parts. By short-cutting these specifications greater standardization allows for increased efficiency and lower prices.

Reports in railroad circles are to the effect car prices are down in the neighborhood of 15 per cent. Since the end of last year, it is reported, prices for box cars have dropped from an average of around $4000 to $4300 to the present figure of about $3600.

test) on qualities lower than flange has been cut in half to 10 cents.

For pricing purposes the base width for sheared mill product is now 24 in. to and including 90 in. for thicknesses ¼-in. (10.2 lb.) and over; 24 in. to and including 72 in. for thickness under ¼-in. When sheared mill product is not required the base width for pricing is over 6 in. up to 90 in. inclusive for thickness ¼-in., and over 6 in. up to 72 in. inclusive for thickness under ¼-in.

Thickness extra for plates under .375 to .250-in., inclusive, has been reduced from 15 to 10 cents per 100 lb; under .250 to .180-in., inclusive, from 30 to 20 cents.

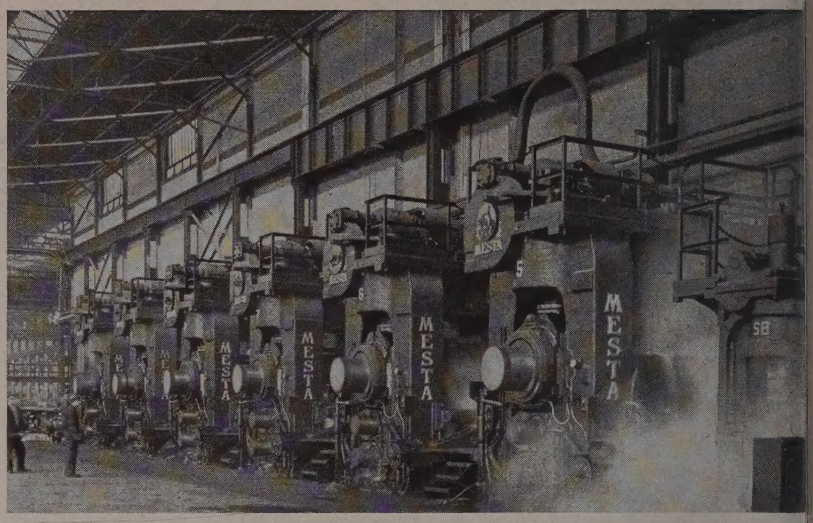
Extras for widths now apply for thickness range ¼-in. and over, and under ¼-in. Previously the thickness break was ⅜-in. There is now an extra of 5 cents in widths 90 to 100 in., inclusive, for ¼-in. plate and over; previously there wasn't any charge for ⅜-in. and over in this width. However, it will be noted that by changing the thickness ranges, the width extra for ¼-in. thick plate in the range 90 to 100 in., inclusive, is now only 5 cents, compared with 30 cents which would have been applicable when the thickness range break was ⅜-in. New width extras for plates ¼-in. thick and over for width range over 100 to 110 in., is 10 cents; over 110 to 115 in., 15 cents; and over 115 to 120 in., 20 cents.

The percentage circular and sketch plate extras have all been reduced 5 per cent, with exception of "regular sketch plates with not more than 4 straight edges," which remains unchanged.

Heat Treatment Extras Revised

Heat treatment and surface finish extras have been revised as follows: Spheroidize annealing reduced 50 cents to $1, or $10 per ton. Former pickling extra of 60 cents has been broken down to under ⅜-in., 40 cents; for ⅜-in. and over, 60 cents.

There is no longer a 10 cent carbon extra for .12, .13, or .14 per cent carbon max; a reduction of $2 per ton. The extra for .10 carbon max has been reduced $3 a ton. No. 2 bessemer steel plate now carries a carbon range of .08 to .33, against previous card, .08 to .30. The .15 to .30, inclusive, open hearth carbon range has been revised to .12 to .33; range of .31 to .50 revised to .34 to .45 and extra reduced from 20 to 10 cents; carbon range of .51 to .75 revised to .46 to .60 and extra reduced from 25 to 20 cents; range of .76 to 1.10 revised to .61 to 1.10 and extra revised from 35 to 30 cents. Extra for carbon range from 1.11 and higher has been reduced from 60 to 50 cents. The footnote referring to No. 1 open hearth has been revised as follows: Any maximum carbon under .11 takes in addition to the above extra for the maximum .11 carbon, an extra of $.025 per 100 pounds for each 0.01 per cent carbon below .11. Lowest restricted maximum carbon is .08 per cent.



This finishing train of rolls in hot strip mill at Sparrows Point, Md., plant of Bethlehem Steel Co. indicates large investment necessary for production of flat-rolled steel for products manufactured under mass production methods

Quality extras on carbon plates have been reduced 5 cents for hot and cold pressing or cold flanging steel (not flange boiler steel), flange steel, ASTM A285 or equivalent; ordinary firebox steel and locomotive flange and firebox; and forging quality. Quality extras for drawing steel were reduced from 50 to 35 cents; case carburizing quality cut 10 cents; while marine steel quality extra remained unchanged at $1.35.

Specification extras were revised as follows: Grade "A" firebox quality ASTM specification A-201, in thickness over 4 to 6 in., from $1.60 to $1.40; grade "B" firebox from $1.60 to $1.50 in same thickness range. For over 6 to 12 in. thick, specification for grade "A" firebox was reduced 10 cents to $1.55 per 100 lb.

For ASTM specification A-212, the thickness range has been revised to 1½-in. and under, in contrast to former range of 1 in. and under, and over 1 to 1½-in. The specification extras applicable to the former thickness range of 1 to 1½-in. have been deleted from the table and the previous specification extras for grade "A" flange and firebox steel for 1 in. and under now apply for thickness 1½-in. and under. Specification extras for grade "B" flange and firebox 1½-in. thick and under are 95 cents and $1.05, respectively. The specification extras applicable for both grade "A" and "B" in thickness range over 1½ to 2 in., inclusive, have been reduced 20 cents for both the flange and firebox quality. Specification extra for firebox grade "A" steel has been reduced 20 cents to $1.30 in thickness range over 2 in. to 3 in., inclusive, and by a similar amount to $1.40 for thickness range over 3 to 4½ in.; for grade "B" firebox steel in same thickness range the extras were reduced 10 cents.

Thickness extras for floor plates have been reduced 5 cents for thickness under ⅜ to ¼-in., inclusive, and to 20 cents or $2 a ton, in thickness under 1/4 to 3/16-in.

Relatively few revisions in extra cards are noted for sheet and strip items, alloy bars, and rerolling and forging quality carbon semifinished steel.

There is now an item quantity extra of 10 cents in range under 10,000 to 6000 lb inclusive for both hot and cold-rolled carbon and enameling sheets; formerly there was no charge in this weight bracket.

Length Extras Increased

Length extras under 60 to 30 in. on hot-rolled sheets (18 gage and heavier) have been increased 5 cents for entire gage range. Slitting extra has been established at 25 cents for all gages, which means a reduction of $3 a ton for 15 gage and lighter. Extra for greasing edges has been reduced to 5 cents. Extensometer tests for determination of yield strength, etc., have been revised from 25 cents per 100 lb to $10 per test. Extras for ordinary flange and firebox steel, and locomotive flange and firebox have been reduced 5 cents. Soft or flange hull steel extra also has been lowered 5 cents; medium and high tensile hull steel advanced 10 cents; marine steel reduced 15 cents.

Manganese ranges and extras have been revised as follows for hot-rolled sheets: .40 to .60 per cent no extra;

1 to .90, 5 cents; .91 to 1.15, 10 cents; 16 to 1.35, 20 cents when carbon is) per cent max or over, 30 cents when der .20 per cent max; 1.36 to 1.63, cents when carbon is .20 per cent ax or over, 40 cents when under 20 r cent max. Chemical requirement tras for sulphur and silicon were nilarly revised. For each .01 per cent duction in standard carbon ranges, the stricted chemical requirement extra ap- ying to ladle analysis limits has been creased from 2½ to 5 cents.

In addition to revision in item quantity tra for cold-rolled sheets, long ternes d enameling sheets, there is no longer e gage break of 21 gage and heavier d 22 gage and lighter in applying qual- extras; the previous lower gage extra plies.

Pickling extras for hot-rolled carbon ip have been reduced from $5 to $10 r ton and more for widths 1 inch and der; while $2 to $8 per ton reduction noted for over 1 to 2 inches, in- sive.

Extras for closer than standard camber erances and for machine straightening t-rolled strip have been reduced $5 $2 a ton, with greatest reduction ted for under ¼ lb per linear foot. ysical quality extra of 25 cents now plies for all gages; previously this tra applied on .0314 and heavier, and cents for .0313 and lighter. Revision specification and chemical require- ents for hot-rolled strip were same as tablished on hot-rolled sheets. As in ld-rolled sheets and hot-rolled, Car- gie has eliminated the differential for ges on quality extras for long ternes,

Alloy Bar Size Extras Revised

Alloy bar size extras for rounds, uares, round cornered squares, and thic sections have been revised to clude a range of 1-1/2 to 1-15/16 at 15 cents and 2 to 2½ in. at cents. Specified length extras have en revised from 10 to 5 cents for ngths 5 feet to under 10, and length nge altered as follows: 20 to under feet; 10 to under 20 feet. New inimum random leeways required in dering to random lengths have been tablished. Lift weight and bundling tras have been clarified in same man- r as on carbon bars.

The size extras for concrete reinforc- g bar rounds have been revised as llows: 1-in. round, from 15 to 10 nts; extras for ⅞, ¾ and ⅝-in. are ichanged; ½-in. revised from 30 to 35 nts; ⅜-in. from 50 to 55 cents; and -in. from $1.20 to $1.30. The size tras for squares have been reduced om 15 to 10 cents.

The carbon extra on forging and re- lling quality semifinished carbon steel is been increased from $1 to $2 per oss ton for range .28 to .60 per cent. Normalizing or annealing treatment extra on forging quality is raised from $10 to $15 per ton. The silicon extra for rerolling semifinished steel of .28 per cent carbon and under has been revised from $5 to $3; and former $2 silicon extra for over .28 per cent carbon max has been dropped.

Only revision in structural shape extra card was that for carbon chemical requirement extras, which duplicate the changes outlined in comment on extra revisions for carbon plates; and an additional special requirements extra of 25 cents for segregation tests involving check analysis.

Auto Firms Analyze Cost Of Higher Steel Prices

Measuring the effect of increased steel base prices and extras as of March, 1947, compared with V-J Day, 1945, figures developed by three representative automobile companies indicate increases in delivered price on cold-rolled sheets of typical size and gage have been 14-22 per cent, with a mean of 18 per cent, while on hot-rolled sheets the spread is 19-35 per cent, with a mean of 31 per cent. Approximately one-half the increase is accounted for by changes in extras, the balance by adjustments in base prices.

Taking a typical example, 18-gage cold-rolled sheet, 65 x 78 inches in size, the base in August, 1945, was 2.95 cents, plus extras of 0.40 cents for size and 0.09785 cents for freight, making delivered price 3.44785 cents. The current figures are 3.20 cents base plus extras of 0.50 cents for size, 0.1133 cents freight, 0.25 cents for drawing quality and 0.05 cents for packaging, making a total of 4.1133 cents, a 19 per cent increase.

One automobile company, striking an average in prices of all steel it buys, finds there has been an increase of 13-25 per cent in base prices, and that whereas prior to the latest price changes extras accounted for 17 per cent of the delivered price they now account for 28 per cent.

Present, Past and Pending

■ BORG-WARNER ACQUIRES FRANKLIN, PA., STEEL MILL

CHICAGO—Borg-Warner Corp. will acquire the Franklin, Pa., steelworks of the Chicago Railway Equipment Co. May 1 and expects to increase employment and production 100 per cent with the mill, a rerolling mill producing a variety of steel rounds, angles, flats and fence posts, being completely modernized. The plant is expected to attain a capacity of 75,000 tons per year.

■ CINCINNATI SHAPER BUYS WAR PLANT FROM WAA

CINCINNATI—Property which it operated during the war has been purchased by the Cincinnati Shaper Co. from the War Assets Administration for $608,000. An 11-acre tract, factory building, 2-story office building and machinery and equipment are included.

■ RAILROADS TO SPEND $650 MILLION FOR CARS

WASHINGTON—American railroads will spend $650 million for 131,600 freight cars under an enlarged car purchase program for 1947-48, the Association of American Railroads told the Interstate Commerce Commission last week. The steel industry's full capacity to supply steel for the program will be utilized until the middle of 1948.

■ LARGE OXYGEN PLANT TO OPERATE IN SEPTEMBER

NEW YORK—The first plant to make oxygen by the ton, joint venture by the Air Reduction Co., the Bethlehem Steel Co. and the Koppers Co., is expected to start operating in September in Johnstown, Pa. It will produce 150 tons daily which will be used in Bethlehem's steel furnaces.

■ SINCLAIR PLANS 1000 MILES OF PIPELINES

HOUSTON, TEX.—Sinclair Oil Corp. plans construction of more than 1000 miles of petroleum product pipelines. A 10-in. line will start from the Houston refinery and extend to Kansas City. From the latter point an 8-in. line will be constructed eastward to St. Louis, southern Illinois and Indiana connecting at Columbus, O., with the Ohio Products Pipe Line system.

■ RELIABLE SPRING DISCONTINUES ESCALATOR CLAUSES

CLEVELAND—Reliable Spring & Wire Forms Co. has discontinued all escalator clauses in acceptance of orders for springs, wire forms and light stampings. The company announced it also has refrained from any general price raise on its line and expects to maintain its prices through production economies.

War's Drain on Mineral Resources

Mining and metallurgical engineers warned beneficiation of low-grade ores, intensified search for new reserves, acquisition and stockpiling of scarce minerals are necessary to assure future industrial progress

PROBLEMS created by the drain of World War II on raw materials and the heavy postwar demands confronting industry were brought into bold relief last week at the World Conference on Mineral Resources held in New York in conjunction with the 75th anniversary celebration of the American Institute of Mining & Metallurgical Engineers.

Prolonged scarcity of many materials and an era of plenty giving way rapidly to an era of insufficiency was seen by Secretary of Interior J. A. Krug. Existing shortages, he said, indicate a need for more intensive search for minerals, purchase or acquisition of scarce materials, such as tin, nickel and others, through trade agreements and the stockpiling of scarce minerals, concentrates or metals.

Commenting on the sharp reduction in open pit ore reserves in the Lake Superior region, Charles M. White, president, Republic Steel Corp., Cleveland, said that much of the American steel industry eventually might be forced to migrate from the lower lake region of the Middlewest to the eastern seaboard or perhaps to the Gulf to utilize imported ores if methods were not developed to utilize the low grade ores of the lake region. He was confident that adequate measures would be taken, but said they represent a problem that still "is before us, not yet behind us." New plants capable of concentrating low-grade ores into usable material will have to be built within a relatively few years, he asserted.

With regard to the larger picture—that of the future iron ore supply of the world—he declared his personal conviction that "any serious shortage of supply is farther in the future than I can foresee."

The conference on mineral resources, attended by more than 3000 members and guests, was held March 17-18, at the Waldorf-Astoria Hotel, with technological and scientific sessions of the Institute continuing over the remainder of the week. More than 200 scientific papers and reports were presented.

The anniversary banquet, Wednesday evening at the Waldorf, was featured by the presentation of medals and certificates of honorary membership, a message from Hon. Herbert Hoover and by addresses by Hon. Spruille Braden, assistant secretary of state, on "American Mining Enterprise in Foreign Countries," and by Virgil Jordan, president, National Industrial Conference Board, on "The Survival of a Free Economy."

The Charles F. Rand medal, awarded the third time since it was established some years ago, was presented to George Magoffin Humphrey, president, M. A. Hanna Co., Cleveland, and chairman of the Pittsburgh Consolidation Coal Co., Pittsburgh, for "constructive leadership in establishing great enterprises for the production of iron ore, of steel, and of coal; for signal success in the administration of large organizations engaged in these industries so vital to the economy of our country."

The William Lawrence Saunders medal was presented to LeRoy Salsich, president, Oliver Iron Mining Co., Duluth, Minn., "for his conspicuous success in developing men and methods of mining and transportation of iron ore; for his significant contribution as operating head of the world's largest iron mining enterprise, to the nation's production of steel so vital to victory in World War II."

The Robert W. Hunt medal was given to Harry K. Ihrig, director of laboratories, Globe Steel Tubes Co., Milwaukee, for his research paper on the effect of composition on hot workability of steel.

The Anthony F. Lucas medal was presented to William Noble Lacey, dean graduate school, California Institute of Technology, for his accomplishments in the petroleum field, while the J. E. Johnson Jr. award went to Kurt Meustaetter, blast furnace engineer, Inland Steel Co., Chicago, for contributions to recent advances in blast furnace practice.

Rossiter W. Raymond award went to William A. Johnson, in charge of the new metallurgical division of the Clinton Laboratories, Oak Ridge, Tenn., in recognition of his paper entitled "Diffusion of the Stable Isotopes of Nickel in Copper."

Asserting that in the last 40 years of industrial expansion the world has spent more of its mineral wealth than in all preceding history, Mr. Krug pointed out that it is evident, because of the world's need for further industrial expansion, that competition will again become extreme in a struggle for control of these mineral resources. The methods of world political and economic reconstruction must be successfully adjusted to alleviate this situation.

Outlining the status of mineral resources in this country, he pointed out that supplies fall in three categories: (1) Those in abundant supply; (2) those that are lacking entirely; and (3) those that have been abundant, but are now becoming depleted.

The abundant group includes magnesium, nitrogen, bituminous coal and lignite, rock salt, phosphate rock and molybdenum. He thought iron and aluminum possibly should also be included because, although high-grade iron and bauxite deposits may become exhausted, these elements are sufficiently abundant

resages Era of Scarcity

the earth's crust or in low-grade de-
sits, to be available through metallur-
cal improvements at higher cost.
In the second, or "have-not," group
e tin, nickel, platinum, industrial dia-
nds, flake graphite and quartz crystals.
The third, or depleted group, includes
large number of metals and minerals
hich have been found in varying de-
ees of abundance and which are be-
g produced at an accelerating rate.
pper, lead, zinc, antimony, tungsten,
anganese, vanadium, chromium, mer-
ry, gold, silver, fluorspar and bauxite
e a few of the items in this large
oup. Petroleum might likewise be in-
ded, he said.
Mr. White looked for a further rise
the country's output of steel over
any decades. Not only is the popula-
n of the country steadily increasing
t the wants of the individual are also
creasing. Thus, he said, the curve of
el production in the United States
ll be likely neither to turn down nor
flatten out, but continue to rise.
"Iron and steel eventually," he pre-
cted, "will not be produced from what
e now consider actual ore. More and
re must come from that vast supply
what we in our present ignorance
w only as potential ore. Initially it
ll cost the world considerably more
make a ton of iron from this raw
terial.
"But engineers and industrialists have
way of making great progress under
e spur of necessity," he continued.
ence there is every reason to believe
at when the abundant low-grade iron
es have become principal sources on
hich the world must depend for its
iron and steel supply, engineering achievements will rapidly overcome present handicaps to the utilization of these deposits."

Discussing steel production abroad, Mr. White said he doubted that output in Germany and Japan will reach prewar peaks for many years to come. On the other hand, he believed that steel plants in allied territories in western Europe and in Russia will assume prewar rates within a relatively few years. However, he doubted that little would be available for export for years to come for the reason that requirements for repair and replacement in these countries will tax facilities heavily.

He thought this would be true even in Russia, which, he said, has announced its purpose to expand steel capacity 60 million tons by 1960—an increase from about 22 million net tons in 1940. Consequently it was the speaker's opinion that the United States, supplemented to some extent by Great Britain, must be the main source of supply for excess needs of the rest of the world.

In his address, Mr. White referred to a number of interesting tables on ore production, shipments and reserves, both for this country and the world as a whole.

Clyde Williams, director, Battelle Memorial Institute, Columbus, O., assumed presidency of the AIME, succeeding Louis Shattuck Cates, president, Phelps Dodge Corp., New York. A. E. Anderson, chief, Metal Section, Research Division, New Jersey Zinc Co., Palmerton, Pa., was named chairman of the Institute of Metals Division, and T. S. Washburn, assistant chief metallurgist, Inland Steel Co., Chicago, chairman of the Iron & Steel Division.

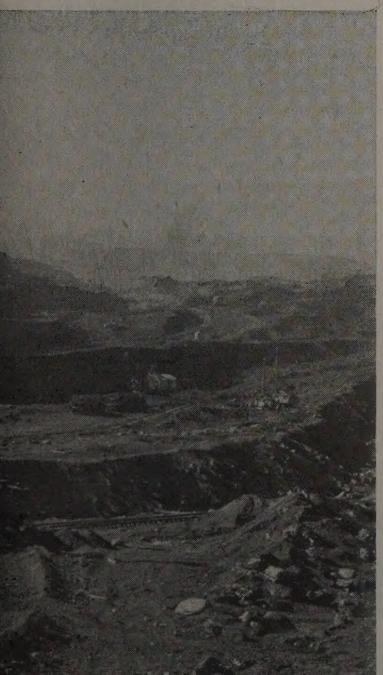
The annual Institute of Metals lecture was presented by A. J. Phillips, manager, Research Division, American Smelting & Refining Co., New York, on "The Separation of Gases and Molten Metal." The Howe Memorial lecture was given by H. W. Graham, director of metallurgy and research, Jones & Laughlin Steel Corp., on "Factors Which Determine Iron and Steelmaking Processes."

Discussing metals and alloys of the future, Dr. Zay Jeffries, vice president, General Electric Co., Schenectady, N. Y., and general manager of the company's chemical department, said that science and industry stand ready to repair a ravaged world and create a new abundance through peaceful adaptations of such discoveries as atomic energy. However, he warned that the opportunity will be missed "if we put our great industrial machine into a strait jacket and dissipate much of our energy in fighting futile and illogical class wars."

Dr. Jeffries predicted that development of new techniques in metallurgy will result from nuclear energy research. He cited the use of radioactive tracers and controls as a method of determining the effects of minute amounts of impurities in metals.

Discussing atomic energy, Dr. Jeffries said "we can speculate without end on the future of this field but no one knows what is ahead. Metallurgists, however, will not have performed their obligation to their profession until they have given their best toward the solution of many problems incident to making nucleonics a servant and benefactor of mankind."

He believed that more efficient utilization of metal lies ahead. High cost metals will be used more in combination with low cost materials, and alloys having long life will be given a high economic rating by designers and users. Engineers, he continued, will be able to analyze the stresses in machines and structures so much better than now that safety factors can be greatly reduced. Tens of thousands of new combinations will be provided by alloys of



Mining iron ore at the eastern end of the Hull-Rust open pit mine at Hibbing, Minn. Electric shovel in foreground has a dipper capable of handling 15 tons of ore at a bite. Mine is operated by Oliver Mining Co., subsidiary of the United States Steel Corp.

RECORD PEACETIME ORE MOVEMENT SEEN

The Great Lakes fleet of bulk freighters will start moving toward the upper lakes early in April to open the 1947 shipping season, fleet operators predicted last week. Shippers are estimating the season's lake movement will aggregate between 75 and 80 million tons of ore, a record for peacetime.

Indicated trip capacity of the 1947 fleet will be 2,642,950 tons, with 268 carriers, one less than last year, expected to be in operation. Assuming 30 trips during the season, indicated capacity will be slightly more than 79 million tons.

Current iron ore consumption is about 7 million tons a month and stocks at docks and furnaces on Apr. 1 are expected to be slightly more than 17 million tons.

the future, Dr. Jeffries predicted.

Clinton H. Crane, president, St. Joseph Lead Co., New York, at the conference on mineral resources, declared that ore reserves of copper, lead and zinc are ample to continue production at the current rate and even at an increased rate for the next 15 to 25 years, and can for the next 100 years produce enough for every essential need. These ore reserves, he said, are based on existing mines and mining districts and are qualified on the basis of present costs and reasonably conservative guesses as to the future selling prices of the metals.

C. Augustus Carlow, managing director, Fife Coal Co., Scotland, declared that the time is due for a new appraisement of world coal reserves on a standardized quantitative and qualitative basis, and predicted that on such a basis, "world reserves, instead of being stupendously large, will be found to be perilously small, calling for the greatest possible conservation alike by mining engineers and consumers."

One session was devoted entirely to the subject of the metal industry and atomic energy. John M. Hancock, partner, Lehman Bros., New York, spoke on "Control of Atomic Energy." P. C. Keith, president, Hydrocarbon Research Inc., Baltimore, spoke on "The Role of Engineers in Atomic Development" and Harry A. Winne and Bruce R. Prentice, General Electric Co., Schenectady, N. Y., presented a paper on "Application of Atomic Energy to Industry."

The latter paper was divided into two parts—atomic power and radioactivity and radiation, with an introduction based on general comments on three fields of interest. These fields, representing the major interests of mining and metallurgical industries in the atomic age were as follows: (1) Production of the specialized materials required by atomic energy installations and processes; (2) use of atomic power in the mining or refining of materials; and (3) use of radioactive isotopes and radiation in metal and chemical processes both for laboratory study and in the production of materials for use in any field.

Labor Relations Panel Features Screw Machine Products Meeting

CLEVELAND

IMPORTANCE of dynamic industrial relations programs was stressed by speakers in a panel discussion which keynoted the annual convention of the National Screw Machine Products Association held in Hotel Cleveland here last week.

With Herbert Buckman, industrial relations consultant of NSMPA, acting as moderator, four leading personnel experts —Eugene Schwartz, attorney, Stanley & Smoyer, Cleveland; R. S. Livingstone, vice president in charge of personnel, Thompson Products Inc., Cleveland; Martin Dodge, member, American Management Association; and R. C. McConnell, industrial relations director, Jack & Heintz Precision Industries Inc., Cleveland—presented their views on such topics as "Unionism Is Not Inevitable," "Earning Employees' Backing," "Public Relations at Home" and "The Foreman's Place."

The convention, which began Wednesday, March 19, with registration and committee meetings, was attended by approximately 340 delegates representing 140 companies engaged in production on automatic screw machines of billions of metal parts—vital components of virtually all mechanical devices made in this country. These representatives of an industry which currently produces $250 million of parts annually came from 15 states, ranging from Massachusetts to California, to attend the meeting. It was NSMPA's largest convention to date, according to Orrin B. Werntz, executive secretary.

Three new committees—industrial relations, public relations and statistics—which were recently established to provide the members with more complete information about the industry held meetings Wednesday to map their programs for the coming year.

"Economic History of the Screw Machine Products Industry" was presented Thursday morning by A. W. Rucker, manager of the Tool Owners Union. This interesting presentation of charts showing the growth of the industry was followed by a progress report on a course in screw machine technology which is being presented by Rochester Institute of Technology in co-operation with NSMPA. Describing the course, which is termed as training for screw machine executives, were Dr. Mark Ellingson, president of the institute, and E. W. Goebel, manager of the course. The training program, begun last fall, has been so successful plans are being made to add short-term courses in particular phases of screw machine operation as refreshers for experienced operators.

An informal discussion entitled "Selling," led by Ted Lundberg, sales manager, Lundberg Screw Products Co., Lansing, Mich., was also held on Thursday. Sales techniques, markets and the problem of rejections were covered.

Friday's program included the following topics and speakers: "Outline of the Manufacturing Standards Program for the Screw Machine Products Industry," by C. J. Baumgart, chairman, NSMPA's manufacturing standards committee; "Simplified Quality Control for Screw Machine Products," by George M. Wentz, technical advisor, NSMPA; "The American Standards Association Postwar Program," by Howard Coonley, president, American Standards Association; "What Is the Hidden Mystery About Cutting Fluids?" by B. F. Hunter, consulting engineer, Honan-Crane Corp., Lebanon, Ind. Speaker at the luncheon meeting that day was Russell Weisman, Cleveland economist, whose topic was "Is It Recession, Depression, Inflation or Deflation?"

TED LUNDBERG
Newly elected president of NSMPA

Presentation of gold plated micrometers was made at a dinner Friday evening to 17 veterans of the screw machine products industry. These "Old Timers" have each spent 40 consecutive years in the industry.

Officers for 1947-1948 were elected as follows: President, Ted Lundberg, formerly vice president of the association; and vice president, Robert Chestnut, Aluminum Co. of America, Edgewater, N. J. William N. Grass of M. J. Grass Screw Machine Products Co., Buffalo, and Orrin B. Werntz, Cleveland, were re-elected treasurer and executive secretary, respectively.

An exhibition of representative items manufactured by members of the association was held in conjunction with the convention. Products displayed included end-use consumers' goods as well as screw machine products used in manufacturing operations.

FTC Asks U. S. Act To Protect Copper Users

Sees danger of panic bidding for inadequate supplies unless government moves to insure equitable distribution

CONGRESSIONAL and administration action to insure equitable distribution of scarce copper to all consumers is asked by the Federal Trade Commission in a report to Congress. The report is the first of a series to be made by FTC on basic industries "in which there is a high degree of concentration of control."

FTC declares the growing copper shortage is international in scope and is not much more serious in this country than elsewhere. The scarcity, the commission says, threatens drastic curtailment in production of necessary durable goods and of capital expansion by the larger corporations in the electrical, motor vehicle, communications and other large copper consuming industries. It also threatens curtailment or cessation of operations by many smaller fabricators of copper and brass products.

The commission said the seriousness of the copper problem, "particularly the relative nearness of possible outbreak of panic bidding for copper," points to the prompt need for both legislative and executive branches of the government "to consider steps to protect the interests of the nonintegrated fabricators from discrimination in the distribution of the inadequate supplies and also to protect the national economy from serious unemployment."

The commission asked "a most careful scrutiny of the production and distribution policies and practices of the domestic copper producers to assure equitable distribution among all copper users."

It also asked that the U. S. take a position energetically opposing international cartels so that production and sale of copper would be on an open market basis.

Liquidation of CPA Scheduled For June 28

Dissolution plan calls for transfer of controls to other agencies. Housing expediter to administer iron and steel rules

CIVILIAN Production Administration, last in direct line of descent from the wartime production control agencies, is scheduled to disappear June 28.

The plan now virtually agreed upon, except in minor details, calls for transfer on April 4 to Housing Expediter Frank R. Creedon remaining CPA controls deemed necessary to the housing program. Principally, these are controls over pig iron allocations for housing and related industry needs, and Priorities Regulation 28. The latter was only recently established in an effort to assure steel for designated critical industry uses.

It is understood that Expediter Creedon will replace PR 28 with a regulation of his own, embodying essential features of the older regulation but perhaps geared more closely to housing program authorities' ideas.

Controls over tin, antimony, rubber, remaining chemicals, and exports, will be compressed into omnibus form and transferred to the Office of Temporary Controls on April 19. This latter move is still contingent on action pending in Congress. There is a possibility that the Department of Commerce may get this group.

With these controls in other hands, Civilian Production Administration will actually be in liquidation. A staff of about 400 will remain for this purpose.

Transferred to Creedon's organization will be some 1230 former CPA workers of all grades. Approximately 1400 are scheduled to be released entirely.

These moves represent an acceleration of plans previously under consideration. It became evident during the week that Congress would not sanction funds requested for longer operation of the agency, hence termination orders went into effect.

German Machine Tools To Be Exhibited at Arsenal

Outstanding German machine tools will be exhibited at Frankford Arsenal, Philadelphia, beginning Mar. 31 and continuing through May 2, John C. Green, director, Office of Technical Services, Department of Commerce, announced recently.

Calendar of Meetings . . .

Mar. 25-26, Prefabricated Home Manufacturers' Institute: Fourth annual meeting, Chicago. Institute manager is Harry H. Steidle, Shoreham Bldg., Washington.

Mar. 31-Apr. 2, Midwest Power Conference: Palmer House, Chicago. Professor Stanton E. Winston, director, Evening Division, Illinois Institute of Technology, Chicago conference director.

Apr. 7-10, National Association of Corrosion Engineers: Convention at Palmer House, Chicago. Program committee chairman is Dr. R. B. Mears, 905 Southern Standard Bldg., Houston, Tex.

Apr. 8-11, American Management Association: 16th annual packaging exposition, Convention Hall, Philadelphia. Alan S. Cole, 330 W. 42nd St., New York, is advisory committee chairman.

Apr. 9-11, Society of Automotive Engineers: Spring aeronautic meeting, Hotel New Yorker, New York.

Apr. 9-12, Electrochemical Society Inc.: Louisville Congress, Brown Hotel. Colin G. Fink, 3000 Broadway, New York 27, secretary.

Apr. 14-17, Second Southern Machinery and Metals Exposition: Atlanta Municipal Auditorium, Atlanta, Ga. Managing director is Michael F. Wiedl, Box 4687, Atlanta 2.

Apr. 16-18, Society of Automotive Engineers: Transportation meeting, Hotel Stevens, Chicago.

Apr. 21-23, National Open Hearth Steel Committee of AIME: Thirtieth annual conference, Netherland Plaza Hotel, Cincinnati. Committee headquarters are at 29 W. 39th St., New York.

Apr. 28-29, American Zinc Institute: 29th annual meeting, Hotel Statler, St. Louis. Headquarters are at 60 E. 42nd St., New York 17.

Apr. 28-May 1, American Foundrymen's Association: Annual convention, Book-Cadillac and Statler hotels, Detroit. Association headquarters are at 222 W. Adams St., Chicago.

Apr. 29-30, May 1, Industrial Packaging Engineers Association: Second annual exposition, Hotel Sherman, Chicago. Managing director is C. J. Carney Jr., 20 W. Jackson Blvd., Chicago.

May 1-2, Society of Automotive Engineers: Personal aircraft meeting, Hotel Lassen, Wichita, Kans.

May 5-9, American Gas Association: Industrial Gas School, Seneca Hotel, Columbus, O. Chairman is Karl Emmerling, 420 Lexington Ave., New York.

May 5-11, Society of the Plastics Industry: Second National Plastics Exposition, Coliseum, Chicago. Society's headquarters are at 295 Madison Ave., New York.

May 11-14, American Supply & Machinery Manufacturers' Association Inc.: 1947 Convention, Hotel Traymore, Atlantic City, N. J. R. Kennedy Hanson, 1108 Clark Bldg., Pittsburgh, general manager.

May 12-15, American Mining Congress: 1947 annual coal convention and exposition in Cleveland. Association secretary is Julian D. Conover, 309 Munsey Bldg., Washington.

May 15-17, Society for Experimental Stress Analysis: Annual meeting, Stevens Hotel, Chicago. Society's address is P.O. Box 168, Cambridge 39, Mass.

May 18-24, World Trade Week: Sponsored nationally by the Chamber of Commerce.

May 21-22, American Iron & Steel Institute: 55th general meeting, Hotel Pierre and the Waldorf-Astoria, New York. Institute headquarters are at 350 Fifth Ave., New York 1.

May 21-24, American Society of Mechanical Engineers: 19th national conference on oil and gas power, Cleveland.

May 22-24, Automotive Engine Rebuilders Association: Silver anniversary convention at Hotel Statler, Detroit. R. G. Patterson, 415 N. Capitol Ave., Indianapolis, is association executive vice president.

May 22-31, Mid-America Exposition: Cleveland Public Auditorium; show of goods made and used in area bounded by Detroit and Buffalo, Cincinnati and Pittsburgh.

May 26-27, Association of Iron & Steel Engineers: Annual Spring Conference, Benjamin Franklin Hotel, Philadelphia.

May 27, Metal Powder Association: Third annual spring meeting at Waldorf-Astoria Hotel, New York. Association headquarters are at 420 Lexington Ave.

Disposal of Government Tools Lags

Prospect dim for meeting June 30, 1948, liquidation deadline. Inventory estimated at 300,000 units with up to 175,000 yet to be received

Stanley C. Backman, right, has been named assistant to Robert M. Littlejohn, War Assets Administration head, second from left. Backman is succeeded as administrator for Zone 3 (Chicago) by Isaac Spalding, second from right. At left is Norman D. Cota, deputy administrator for field services

HOW MUCH longer will be required to dispose of the government's inventory of surplus machine tools? This question has been asked often of late by machine tool builders who fear the effect of continued large offerings of tools at bargain prices upon their own sales of new tools over an indefinite period ahead.

Best answer to this question is: Prospects for quick liquidation of the government-owned surplus inventory are none too good. Unless the tempo is stepped up much more rapidly than to date, the machine tool liquidation program will be far from completed on June 30, 1948. This is the deadline which the War Assets administrator, Maj. Gen. John M. Littlejohn, recently set for winding up the affairs of the WAA.

Undetermined Number Yet To Be Sold

Unfortunately, there are no reliable figures about the machine tool program. Those made available to STEEL cannot be reconciled; this is not meant as any reflection upon the WAA, for it would require many additional thousands of clerks to maintain records showing all details of the agency's ramified operations. The WAA estimates its present machine tool inventory as numbering "substantially 300,000 units representing a cost to the government of slightly more than $1 billion." In addition, the WAA expects to get from the owning agencies "an additional 150,000 to 175,000 units which cost in the neighborhood of $1 billion." That would indicate that WAA will have to find markets for 450,000 to 475,000 tools over and above what it already has sold.

But on Jan. 1, 1947, the WAA estimated its inventory of machine tools as 275,000 units, with 125,000 still to be declared by the owning agencies, making a total of 400,000. As of Jan. 1, too, the WAA estimated that it was selling machine tools at the rate of 150,000 units annually. The only safe conclusion that can be reached from these figures is that the WAA still has "a lot" of tools to sell.

Most important single factor having a bearing on the surplus machine tool disposal program is that the armed services now have reached the stage of knowing about how many tools they will want to place in storage for use in event of a military emergency. Several months ago, teams of Army and Navy and Air Forces officers started out with lists of machine tools they sought to locate in WAA warehouses. The Joint Army-Navy list called for some 79,000 tools, and the Air Forces list for some 66,000. A good many items had to be struck off the lists at the outset because they involved tools that were in short supply and hence had to be held for sale to assist industrial reconversion. And many items could not be located in WAA stocks. Altogether, some 100,000 tools in WAA stocks have been tagged to insure their being reserved for the military forces. But transfer of these tools will necessitate congressional action; it will take an act of Congress to permit the WAA to transfer title to the military. It also will depend on the appropriations Congress votes to the military forces for the fiscal year ending in 1948—for it will take a lot of money to move the tools and store them so that they will not deteriorate and become useless.

The 100,000 tools mentioned as being held in WAA warehouses for transfer to the military forces do not include a substantial number of tools still in the possession of the Army, Navy and Air Forces. The armed forces want to store many of these tools for future use. Taking this angle into consideration, President Truman made an exception of the armed forces when he instructed all owning agencies, on Feb. 8, to dispose of all surplus property, or to declare as surplus to the WAA no later than June 30, 1947, all still remaining unliquidated as of that date. The exception permits the armed forces to make their final declarations to the WAA three months after Congress acts on the military appropriations for fiscal 1948. In other words after the armed forces have been advised as to what money they can spend in fiscal 1948, they will have three months to decide what machine tools they will put in storage.

WAA spokesmen say that President Truman's order of Mar. 7, directing the WAA to locate and sell all obsolete and outworn machine tools in order to augment the supply of iron and steel scrap for the steel and foundry industries, will not have much immediate effect.

There may be a fair-sized amount of scrap in the surplus tools still unsold. This is in single and special-purpose tools which make up a substantial portion of the present inventory. Before the WAA can sell these tools for scrapping it will have to be advised by the armed forces that the tools will not be needed in future production lines. It is unlikely that the fate of many of these tools will be determined until Congress has acted on the fiscal 1948 military appropriations.

However, last week the WAA received armed services' approval to scrap 80,000 obsolete special purpose machine tools which will provide 250,000 tons of scrap metal for industry. The tools to be scrapped will be sold in lots of not less than ten machines by competitive bidding through regional and district WAA offices. Electric motors and other salvageable parts are to be removed and offered for sale.

At a recent meeting with its Machine Tool Industry Advisory Committee, the industry men made certain recommendations which now are being considered by the WAA.

By one recommendation, the Claytor formula would be eliminated completely

nd the new fixed price policy adopted nroughout. WAA records of cash sales ndicate that universal application of the ixed price policy would speed up dis-osals. In October, 1946, the WAA sold nachine tools that cost the government round $35 millions. In November, the irst month under the new fixed price olicy, the machine tools sold represented value of $47 millions, and in Janu-ry it was $58 millions. There is no uestion but that the fixed prices, which re substantially lower than the Clayton ormula prices, have attracted vast num-ers of additional customers. The change nvolved in a complete changeover would ot be too much of a shock, for only bout 20 per cent of the machine tools n the WAA inventory still are priced y the Clayton formula.

One result to be brought about by the resident's order of Feb. 8 will be early quidation of many machine tools lo-ated in contractors' plants but owned by FC's Office of Defense Plants. These ools represent a government investment f about $86 millions. Of these, tools alued at $30 millions are in process of eing sold to the lessees in possession, ools valued at $8 millions are still be-ng used on government work; as to the ther $48 millions of tools, the lessees ave not yet decided whether they are nterested in purchasing them. Compa-ies in this latter group now will have o make their decisions promptly if they vant to prevent the RFC from declaring he tools as surplus to the WAA on or efore June 30, 1947.

Another industry suggestion aimed at elping the WAA to speed up its machine ool disposal program calls for the sale f machine tools to educational institu-ons at fixed nominal prices. At present he WAA sells to such institutions at a iscount of 95 per cent. Even after de-ucting this huge discount the price still beyond the reach of thousands of chools with limited funds. The industry uggestion is that a flat price of $5 or 10 per unit be put on such tools.

The WAA continues to encourage sales f its surplus machine tools to foreign uyers. It does this by backing up ma-hine tool dealers with advertising and upplying them with literature printed n the languages of the foreigners to be olicited. It has no breakdown to show he volume of such export sales; this robably means that the income from uch sales is not large enough to call or separate listing.

Buick To Allocate 11% of Cars to West Coast Area

Approximately 11 per cent of Buick Motors 1947 domestic production has been tagged for distribution in Califor-nia, Washington, Oregon, Idaho, Utah, Nevada and Arizona, Harlow H. Curtice, Buick general manager, told West Coast dealers in San Francisco.

At the same time, Mr. Curtice stated that Buick assemblies at the General Motors South Gate, Calif., plant totaled 11,494 in 1946. A substantial increase is looked for in 1947.

Buick capacity will soon be expanded to a 520,000 cars a year level, but be-cause of shortages Buick production in the first seven weeks of 1947 was held to about a 275,000 annual rate, he said. Buick capacity will be raised to a point 40 per cent higher than the 1941 model year by midsummer as result of large scale, postwar expansion, including a 750,000 square foot sheet metal shop.

WAA Plans To Dispose of Richmond, Calif., Yards

War-famed Richmond, Calif., shipyard I, a part of shipyard II, and the pre-fabrication plant and other areas are be-ing readied for disposal as surplus, War Assets Administration has announced.

To facilitate disposal, the properties have been divided into seven separate parcels. Largest parcel is the 79 acre main portion of yard I. Second in size is the 74 acre northern section of yard II, owned in fee by the government. Following in order; a 36 acre parcel, formerly the prefabrication plant and storage area; a 21 acre parcel, formerly known as the Enterprise Foundry Co. property, and three smaller parcels of 17 acres, 8.4 acres and 4.8 acres respectively.

A total of 242 acres, and buildings with a total of 1.8 million square feet of floor space, are included in the property. Original cost to the government was $16 million. Bidding on the parcels will close Apr. 15.

Owens-Corning To Build Plant at Santa Clara

Owens-Corning Fiberglas Corp., To-ledo, O., has purchased a 42-acre site in Santa Clara, Calif., for a $7 million plant which eventually will employ 1000. An-nouncement of the firm's plan to build in Santa Clara county's industrial area, came on the heels of an announcement late in February that Westinghouse Electric Corp. has acquired the Joshua Hendy Iron Works at Sunnyvale, 12 miles north and plans to step up payrolls from 1100 now employed to 7500 with an annual payroll approximating $20 million.

Harold Boeschenstein, president of Fiberglas, said the plant would contain 500,000 square feet of manufacturing and warehouse space. Six months will be required for preliminary engineering work. Facilities are expected to be com-pleted next year.

ICC Orders New Rates to Coast Effective April 1

Proposed tariffs on steel from Geneva upheld by commission following 2-day hearing. Fur-ther study of question planned

LOWER freight rates on steel shipped from Geneva, Utah, to Pacific Coast points is assured after Mar. 31 as the re-sult of a ruling by the Interstate Commerce Commission permitting its suspension order to expire that date.

The issue has not been completely dis-posed of, however, since the ICC has also ordered a thorough investigation of the matter and all interested parties have been advised to prepare their arguments for presentation at hearings to be held over a period not yet designated. If evidence indicates lower rates from Geneva are illegal or unfair to any of the parties involved, the commission will then order restoration of the existing higher tariffs. It was apparent at the two-day hearing, Mar. 11-12, however, that the commission was not sufficiently im-pressed with the protests to order an ex-tension of its suspension order.

The lower rates had been originally scheduled to go into effect Mar. 1. How-ever, they were temporarily suspended when protests were filed by several eastern steel companies, Henry Kaiser for the Fontana steelworks, the Colorado Fuel & Iron Corp., and other interests, who claim the proposed rates were dis-criminatory in favor of the United States Steel Corp. which owns and operates a steel plant at Geneva. The lower rates, which now become effective Apr. 1, will result in a reduction of 31 per cent.

Lone Star Steel Authorized To Buy Surplus Facilities

Stockholders of Lone Star Steel Co., Dallas, Tex., last week authorized the company to accept War Assets Adminis-tration's offer to sell for $7,500,000 the Daingerfield, Tex., blast furnace and the government-owned coal mines near Mc-Alester, Okla., contingent upon the com-pany's compliance with the financing con-ditions.

Also authorized by the shareholders was an increase in capital stock of Lone Star Steel from 100,000 shares up to one million common shares of $1.50 per share (no par value). Issuance of up to $500,-000 in debentures if that additional amount be needed was also authorized.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STE*

Administration taking anticommunism stand. President's request for aid to Greece and Turkey aimed at halting spread of Russian influence. Schwellenbach urges Congress to outlaw Communist party, following revelation of labor union activities

WASHINGTON old-timers who recall how the White House used to deride the old Dies committee and otherwise discourage anticommunist activities, lately have been rubbing their eyes over manifestations of the changes that come with time. Once was when President Truman, in urging the Congress to furnish aid to Greece and Turkey, let it be known specifically that one aim was to check expansion of communism. Another occasion came when Secretary of Labor Schwellenbach urged Congress to outlaw the communist party in the United States.

The big question is: Can communism or any other ism be outlawed under the Constitution and the Bill of Rights? To get the answer to this question the House Un-American Activities Committee will hold a series of hearings to start Mar. 24 or 25. The purpose, says Chairman J. Parnell Thomas (Rep., N. J.), will be to "explore the entire question of how far Congress can go in outlawing undesirable organizations." Mr. Thomas is confident that some way can be found to deal effectively with groups that might threaten the security of the nation.

Would Withhold Salaries

One way of dealing with the situation is being considered by the House Appropriations Committee: Appropriation bills would provide that no funds may be spent in paying salaries to certain government employees suspected of being party-liners. The subcommittee which has charge of the Labor Department bill, for instance, is considering a recommendation that no funds be allowed for the $10,000 salary of Edgar L. Warren, director of the Labor Department's Conciliation Service, and for salaries of other Conciliation Service officials. Subcommittee Chairman Keefe (Rep., Wis.) says: "I intend to do everything I can to see that Edgar L. Warren does not continue to serve as head of the Conciliation Service" and he pointed out that the records of the House Un-American Activities Committee showed that Mr. Warren had belonged to the American League for Peace and the Washington Bookshop, both described as "communist front" organizations in committee reports.

Another approach is that of the House Education and Labor Committee which has ordered an investigation to determine whether officials of the Allis-Chalmers local of the UAW-CIO committed perjury when they denied Communist party affiliations. The committee was deeply disturbed, first by the record of communistic activities revealed by Allis-Chalmers officials, second by the murder of George P. McNear Jr., president of the Toledo, Peoria & Western Railroad, two weeks after his appearance before the committee, third by the death threats to one of the committee members, Rep. Carroll Kearns (Rep., Pa.), for having dined with Mr. McNear. The committee is getting ready to put on a full-dress investigation of union racketeering and of communistic participation therein.

Asks Balanced Merchant Marine

To Rep. Willis W. Bradley, (Rep., Calif.) goes at least some of the credit for stimulating the President's action in appointing a committee to investigate

GARRISON NORTON

Nominated by President Truman as assistant Secretary of State, Mr. Norton has served as director of the Office of Transportation & Communication in the department since last July

and report "as to the number and types of merchant vessels to be constructed annually under a stable, long range program." Captain Bradley, an old-time shipping man, who is chairman of the House Committee on Merchant Marine & Fisheries, has been accusing the White House of gross failure to carry out the will of Congress for a balanced merchant marine as described in the statement of policy of the Merchant Marine Act of 1936.

Shipping men and shipbuilders regard the committee as a "good" one—and expect it can come to no other conclusion than that a substantial number of vessels particularly passenger and combination passenger and cargo, must start to be built at once if we are to have a balanced merchant marine. The committee: Chairman, K. T. Keller, president, Chrysler Corp., Detroit; vice chairman, Marion B. Folsom, treasurer, Eastman Kodak Co., Rochester, N. Y.; Andrew W. Robertson, chairman, Westinghouse Electric Corp., Pittsburgh; James B. Black, president, Pacific Gas & Electric Co., San Francisco; Vice Adm. Edward L. Cochrane, former chief of the Navy Bureau of Ships.

To help matters along, the Maritime Commission now is preparing a report to show the deficiencies of the present American merchant marine. This report will show the need for shipbuilding program of "substantial" size in order to provide more passenger vessels for the double-barreled purpose of keeping our place in the competition on the seas, and of providing for national security needs.

Captain Bradley now is expected to hold fire in his campaign to get congressional approval of immediate construction of two luxury liners, at a cost of $34,800,000, to be "the finest ships afloat." If, as he hopes, the administration now proceeds to carry out the purposes of the Merchant Marine Act of 1936, no special act need be passed to obtain construction of the needed vessels.

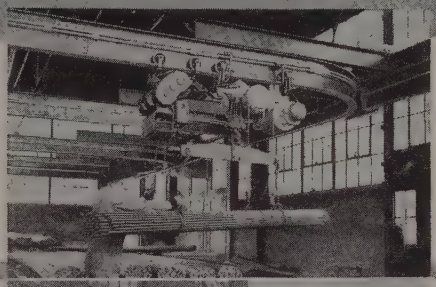
Senate Pushes Agenda

By going to daily sessions, the Senate is expected to get through a large amount of business in the next two or three weeks. The agenda involves: 1—The bill to limit Presidential tenure by Constitutional amendment; 2—approval of the House-passed portal pay bill; 3—action on the nominations of David E. Lilienthal and Gordon R. Clapp to head, respectively, the Atomic Energy Commission and the Tennessee Valley

MONORAIL PAYS!!

PRODUCTION INCREASE
From 26 to 48 tons per day

By furnishing definite overhead routes for the movement of bar stock, congestion was eliminated. Free flow of materials to production machines nearly doubled their output.

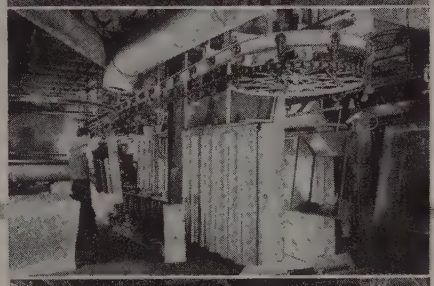


HANDLING COST
Saving of $150 in 4 months

Transfer of sheet metal from truck to storage is costly when handled sheet by sheet. A simple system such as this actually saved $150 in handling cost within four months.

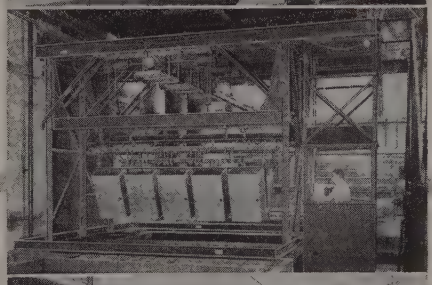
TIME SAVED
Drying time reduced 70%

Passage of metal furnace parts through infra-red dryers cuts 70% from the time formerly required for drying. This operation on monorail also eliminates costly handling labor.



INCREASED CAPACITY
30% more units moved through process

Nearly a third more units can be handled from tank to tank throughout the cleaning process. All handling is controlled from cab by a single operator.



LABOR SAVED
Unloads truck with 26 less man hours

Operators claim to save $20 per truck over former unloading costs. With power operated equipment and special grab for handling 2-ton loads, complete safety is assured.

Let an American MonoRail Engineer explain how similar savings can be made in your handling methods. Write for Bulletin C-1 showing successful applications.

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Authority; 4—action on extending sugar rationing beyond the March 31 deadline; 5—setting a formula for the Presidential succession; 6—action on labor legislation (particularly because the House is looking to the Senate to take the initiative on labor law revision); 7—action on extension of rent control; 8—action on the co-called Bulwinkle bill which would exempt railroad freight rate agreements from antitrust law suits provided the agreements have been approved by the Interstate Commerce Commission; 10—action on help for Greece and Turkey.

OPA Disintegrating

In the meantime, the setting of the June 30 deadline for the OPA by both houses is bringing a quick trend toward disintegration of that historic agency. Dismissal notices have gone out to thousands of remaining employees in keeping with a warning from the House Appropriations Committee that it will not appropriate additional funds to pay for terminal leave of laid-off employees. In other words, the OPA brass hats must arrange to take care of terminal leave pay out of their present funds. For the same reason, dismissal notices have started to go out to remaining employees of the CPA. The latter agency whose wartime predecessor, the War Production Board, sprawled all through the Social Security Building and neighboring structures, in recent weeks has occupied a few corridors in the Social Security Building.

Iron, Steel Book Readied

With a competent staff hard at work on the task, the Commerce Department is planning to complete its projected book on iron and steel before the expiration of fiscal 1947. In view of the reduced appropriations the 80th Congress is handing out to government departments and agencies in general, Commerce officials decided to close up this book at once while they have the necessary funds, instead of waiting and possibly doing a more comprehensive job later on. The book will run several hundred pages in length and is slated to be placed on sale by the Superintendent of Documents, Government Printing Office, in June.

Although suggestions by certain consumers helped influence the Commerce Department in its decision to publish the iron and steel book, officials emphasize that no propaganda value will attach to it. It is to be entirely factual; it will contain information and statistics which previously have been published for the most part but which never have been assembled between two covers in the past. If consumers attempt to use the book's contents to support their claims that they are not receiving fair treatment in present distribution of steel products, that is an angle the Commerce Department has not taken into consideration at all.

The first part of the book will be a history of the iron and steel industry from its beginning in the colonial period up to the outbreak of World War II. It will cite the number of plants and their locations at given times, and the nature of their facilities. A second part will describe what happened to the iron and steel industry during World War II. A third part will describe what has happened since the end of the war and give a picture of the industry as it exists at the present time.

A fourth part will deal with economics of the iron and steel industry. It will cover such subjects as raw materials, transportation, how various sections of the country benefit from iron and steel production, the employment the industry furnished directly and indirectly. It will set forth the industry's capital structure, its earnings record, the trend in the direction of lowering of iron and steel prices over the years. It will contain the record of cyclical swings which have led to the industry's reputation for being "either a prince or a pauper." This portion is regarded as of special importance in that it should be a reservoir of information for Congress and the administration as well as the general public.

The concluding section will deal with steel distribution. It will include the annual distribution statistics for years past and attempt to trace the connection between the steel distribution statistics and the rate of growth of steel consuming industries. It will also trace the trend in the use of the various products, as sheets and strip, tinplate, bars, etc.

Commerce officials say they have discussed their plan with representatives of the American Iron & Steel Institute, and that they have received assurances of adequate co-operation from the Institute and also from individual steel companies. They feel confident, as a result, that the book, when it comes off the press, will be received as a work of unquestioned authority.

Economy Drive Heeded

A rather signficant event was the appearance of Harry B. Mitchell, president of the Civil Service Commission, to give his views on the Langer-Chavez bill to liberalize the civil service retirement program by increasing the annuity benefits an average of $250. The cost would be too much, said Mr. Mitchell; it would up federal expenditures by $200 million a year! This is only one of many indications that government d partment and agency heads really a impressed with the Republican eco omy drive.

One of the jobs now in danger of b ing discontinued is the preparation of detailed history of the War Produ tion Board and its manifold activitie More than 200 employees have worke on this history during the past ye and the first volume, to run about 200 pages, now is in the hands of th Government Printing Office. Originall planned to run to three volumes of sub stantially equal size, it now looks a though the two remaining volumes w have to be dropped—unless Congre authorizes a special appropriation $2 million to complete them.

Bureau of Mines Reports

Copies of the following reports ma be obtained upon request from the B reau of Mines: "Report of Investig tions 3991"—It publicizes analyses zinc concentrates obtained by re-trea ment by modern milling methods of th Fox and Mills tailing piles near Haz Green, Wis.

"Report of Investigations 3998"— describes the negligible results obtain from diamond-drill exploration of th Johnny Bull-Silver Knight lead zi property in the Cerbat Mountains, M have County, Ariz. Most of the vei was found to be barren or to contai very low-grade zinc with negligibl amounts of lead.

"Report of Investigations 3997"— sets forth analyses of ore samples take from the Ellis manganese deposit i Sierra County, New Mexico.

"Report of Investigations 3993"— contains analyses of samples from 4 holes drilled in the Drum Mountain ma ganese project in Juab County, Utah.

"Report of Investgiations 3988"— sets forth the negligible results from program of trenching, test pitting an sampling of iron ore deposits in Lincol County, New Mexico. Twenty-fiv mines and prospects were investigated The deposits proved "too small to yiel the tonnage necessary to amortize equip ment costs."

"Report of Investigations 3990"— contains analyses of iron ore from hole drilled in the McCoy iron deposit i Lander County, Nevada.

"Report of Investigations 3995"— describes properties and results of dril ing operations in the Terlingua mercur deposit in Brewster and Presidia Coun ties, Texas.

"Report of Investigations 3996"— contains analyses of ore samples fro the Lee fluorite mine in Hardin County Ill.

Belgium Discontinues Coal Subsidies; Steelmakers To Ask Price Increase

Payments will be made to electric power stations and gas works to enable them to maintain present rates. Export demand for Belgian and Luxemburgian steel continues brisk, with Holland, Switzerland and Sweden leading bidders

TO REDUCE budgetary expenditure he Belgian government has discontinued ubsidies hitherto paid to the coal indus-y. Saving to the state will amount to bout $45 million. The average price of oal will be increased to 600 Belgian ancs ($13.65) per ton.

Subsidies are to be granted to electric ower stations and gas works to enable hem to maintain their present tariffs. is estimated that these measures to revent a rise of the cost of living will ost $28 million. The value of the sub-dies withdrawn from the collieries totals bout $65 million.

The increase in the price of coal is ound to be reflected in the cost of roduction of steel, and Belgian steel-akers are approaching the price control ffice to be allowed to increase the home rices of steel, and export quotations are kely to be advanced. In anticipation of is situation, exporters have been re-rved in accepting fresh contracts, es-ecially from the so-called free markets. he demand from abroad remains brisk, xcept from Greece and Argentina. In l event's makers are booked well ahead. ecently merchant bars were quoted at from 4300 to 5400 francs ($97.70 to $122.70) for Switzerland.

The estimated tonnage of Belgian and Luxemburgian exports of iron and steel for 1946 is 1,500,000 metric tons. The principal market was the Netherlands, which took over 330,000 tons; Switzerland with 314,000 tons, Sweden with 214,000 tons and Argentina with 160,000 tons and Denmark with 110,000 tons, followed. Markets served by Belgium and Luxemburg cover the whole world. The principal products exported were merchant bars, 457,000 tons; structural steel, 295,000 tons; plates and sheets, 246,000 tons; hoops, 105,000 tons.

Belgium has a plan of reconstruction, to be spread over 10 years, which includes modernization of the steel industry. Estimates of proposed investment are reported to be $215 million for the heavy section of the industry, and $300 million for the finishing end.

Germany

The present average monthly output of steel is rated at 250,000 tons, of which nearly 200.000 tons come from the British zone. A limited amount of trade between private traders in the British and American zones will now be permitted with Great Britain and other countries. This trading will require the approval of the control in Germany, and trade with Great Britain will require licenses from the Board of Trade. This measure applies to essential goods only.

Czechoslovakia

A new steel plant has been put into operation at the national works of Vitkovice. The daily output in January was reported to have been over 2000 metric tons, exceeding the target by 25 per cent.

France

Owing to the scarcity of coke supplies, especially from the Ruhr, some blast furnaces have been supplied with gas coke. A coke oven plant near Paris has been supplying works in the East.

A rapporteur has been appointed to report on the communist plan to nationalize the iron and steel industry. The present government is not committed and has no immediate plans for further nationalization beyond what already exists.

A company has been formed under the style of Société Marocaine d' Etudes Sidérurgiques to study the establishment of a steel industry in Morocco, where new coal deposits have recently been discovered. Taking part in the undertaking are, among others, Schneider, les Petits-Fils de François de Wendel, Ugine, Société Chatillon Commentry et Fourchambault, Denain et Anzin.

Holland

Holland is in great need of rolled steel products, and her own capacity is not sufficient to meet her requirements. The plate mill at Yjmuiden has been returned from Germany and is ready to restart. Dutch iron and steel requirements for 1947 are estimated at 1,300,000 tons. Holland depends largely on imports. Before the war, large tonnages came from Germany and negotiations are going on in the hope of eventually resuming direct imports from that country, with which there are great facilities for transport. At present the largest share of imports comes from Belgium and Luxemburg.

Hungary

Hungary has resumed a certain amount of export trade in steel products. The first contracts are reported to have been made with Holland, for rails and sleepers and welded tubes. These products are to be routed via Fiume and Trieste, and then by ship to Rotterdam. Business is transacted by one export organization in Hungary, which acts for the three principal works, including the state works.

CHARGING SCRAP: This view, taken in the plant of Guest Keen Baldwins Iron & Steel Co. Ltd., Port Talbot, England, shows ground type charger charging box of scrap into furnace

Large Potential Market Awaits Air Conditioning Manufacturers

By L. E. BROWNE
Associate Editor, STEEL

Postwar production curtailed by material and component shortages. Industry to require 135,000 tons of steel products in 1947, plus substantial tonnages of castings, forgings and nonferrous metals.

AIR CONDITIONING and ventilating equipment this year will require close to 135,000 tons of finished steel products, provided the manufacturers can obtain it. Also required are substantial tonnages of castings, forgings, and nonferrous metals, particularly copper and aluminum.

Potential market for air conditioning equipment for the five years starting with 1947 has been estimated at $1 billion. This figure may be realized if new types of equipment and processes, such as electronic air cleaning, win home-use acceptance and are widely adopted in commercial, industrial and transportation applications.

Although physical reconversion of the air conditioning industry was generally completed by mid-1946, its progress has been hampered by material and component shortages. Castings and motors have been the most critical of these. Gradual improvement in supplies, starting with aluminum and copper-base products, is noted. One of the first postwar changes was the return of copper-base alloys for condenser and some other tubing for which steel had been substituted during the war.

Manufacture of air conditioning equipment was not entirely suspended during the war. Such equipment was required for some war plants; and air conditioning manufacturers, while producing other war materials, also continued to make air conditioning equipment.

Air conditioning, mechanical refrigeration and ventilation are usually considered parts of a relatively young industry. From a modern engineering standpoint this is true, but when man first discovered he could warm his chilled hide before a fire, air conditioning might be said to have begun. Where air conditioning begins and ventilation, air handling, purifying and plain heating ends is a moot question.

But delivery of clean, washed or filtered air in controlled volume at regulated temperatures to predetermined areas by mechanical means is strictly air conditioning in simple terms. There are many variations falling loosely in the classification of air conditioning, including heating, cooling, dust and fume removal, power production by forced draft and others.

At any rate, expansion in the industry has been phenomenal in the last two decades. First industrial application probably was made in 1906 when Sturtevant engineers installed a system for cooling, dehumidifying and circulating air at a chocolate manufacturing plant in Boston. This pioneer installation is still in service.

Great progress in air conditioning engineering may be expected in transportation. A satisfactory system for the passenger automobile is yet to be produced; true the automobile is better heated and ventilated and in some areas artificially cooled, but a flexible controlled air conditioning system within weight and space limitations is still missing. Such a system has been created for passenger buses.

Since 1910, when the first installation was made on railway cars, engineering progress has been noteworthy. But few air conditioning engineers are satisfied with results up to now and most are working on startling innovations.

The packaged or self-contained central plant unit for railway cars as well as

To make further refinements in air conditioning equipment, Surface Combustion Corp., Toledo, O., has opened this new testing laboratory at Columbus, O.

other types of application is receiving increased attention. One weakness with many railway car systems is power loss, depending on train speeds and resulting in temperature rises or declines. On some freights, with average speeds lower than passenger trains, this accounts for the retention of old brine lines, it being possible to build up a reserve for maintenance of more uniform refrigeration.

A packaged self-contained unit with an individual power plant fitted to a special compartment in each car, easily removed and interchangeable, controlled and regulated in the coach is undergoing experimentation. Subway and street railway cars are going out of shops with improved air conditioning and ventilation systems, the air being cleaned, filtered and moved in greater controlled volume through the car.

The number of parts and materials required for strictly air conditioning equipment, exclusive of heating and ventilating, dust and fume removal, industrial drying and other forms of air treatment, makes procurement a major problem. Although also used in other mentioned equipment, parts for air conditioning include compressors, condensers, fans, wheels, air washers, electronic air cleaners, cooling and heating coils, motors, evaporators, and many others.

Steel Needs Are Varied

For air conditioning and ventilating equipment, sheet steel requirements will approximate 85,000 tons this year, about one-half hot-rolled, with cold-rolled and coated sheets accounting for nearly 40,000 tons about equally divided. Hot and cold-rolled strip will mean 10,000 tons more, about three-fifths hot-rolled. Estimated requirements also include 2000 tons shapes, 4500 tons plates, 5800 tons hot and cold-finished bars, better than half hot-rolled, 550 tons wire, 400 tons black plate and around 6500 tons pipe and tubing.

Shipments of unitary equipment (air conditioning and commercial refrigeration) totaled 338,796 units in 1940, last prewar year. Except for special types produced during the war, unitary shipments fell off during that period. Upturn in shipments came promptly during the second half, 1945, but expected continued gains were not made last year because of strikes and materials shortages. However, total shipments this year should surpass 1940; unitary shipments in 1945 totaled 215,959 or 41 per cent over the 153,026 units in 1944.

There are 207 manufacturers making some type of this equipment. These figures are for all types of air conditioning and commercial refrigeration equipment normally sold as standard products, but not certain types manufactured to order for special uses. This leaves out many specially engineered installations.

More than 60 different types of equipment are made for several thousand applications, from tiny blowers held in the hand to gigantic fans, 12 ft and more in diameter, used in ventilating vehicular tunnels. As the modern high-speed elevator makes the skyscraper practical, so the fan makes possible long vehicular tunnels. Without it, fumes in the tunnel would make passenger transportation impossible.

Air conditioning for precision machining was given considerable impetus by war production, especially in the antifriction bearing industry. Lens grinding and other closely controlled operations require uniform temperature to prevent expansion and contraction, thus holding tolerances. Humidity is generally held low enough to prevent fingerprints on polished surfaces, reducing danger of corrosion while dust and dirt in the air is eliminated.

Some Units' Wartime Output Rose

Wartime declines centered almost entirely in less essential units; many components and accessories were produced in higher volume. Condensing units in 1944, the last full war year, were shipped to the value of $21.9 million compared with $18.8 million in 1940; heat exchanger equipment production was also higher while compressors and compressor units were about equal to the last prewar years.

Sharpest declines were in display cases, soda fountain and ice cream cabinets, beverage cooling and dispensing equipment. Most enclosures were also temporary war casualties, exceptions being walk-in coolers and cold storage doors.

Shipments of many units restricted are now approaching or are ahead of the prewar level in both dollars and units. Yet in many instances goals have not been reached and production is below planned programs.

Marine air conditioning performance is now commonplace. Industrial application is broadening rapidly in many fields of manufacturing. Efforts to control temperature and humidity by mechanical ventilation only is fast becoming substandard in many places, including ships.

Adaptions of air conditioning used in passenger planes to passenger and commercial motor vehicles is being studied; on aircraft heated air is circulated through hollow walls. For land vehicles the major problem is draftless ventilation with cleaned air at controlled temperatures.

For households and industry, electrostatic air cleaners are moving off production lines in greater numbers. There are various types and models for removing dust from both houses and factories. These come in compact attractive cabinet models or may be built into a furnace unit.

On new New York subway cars thermostatic control of heat provides more uniform temperatures. Eight 10-inch horizontal fans move air comfortably over every passenger location, seated or standing, instead of the five vertical fans in the old cars which blast air down the back of some necks while nearby passengers swelter. Forced ventilating equipment will circulate 6640 cubic feet of air per minute after passing it over sterilizing lamps. In addition, two blowers each draw in 1500 cubic feet of fresh air per minute.

A new line of small condensing units for refrigeration includes seven air-cooled and two water-cooled units, ranging in capacity from 1/6 to 1½ hp, replacing larger size types in that range. The three smallest units are mainly for self-contained applications; the others are intended for remote installations but are applicable for self-contained use. All of them feature compactness, particularly in height reduction.

A major marine project is the conversion of three Victory ships to refrigerated carriers and air conditioned liners. The cooling equipment will serve the ship's stores, cargo refrigeration, and both air conditioning and water coolers. Two compressors serving ship's stores handle 15 rooms of refrigerated compartments in all. Two more compressors provide cargo refrigeration, carrying either frozen cargo at zero F or chilled cargo at 32 to 35F, or both.

Pittsburgh Coke & Chemical Expects Full Production

Products of Pittsburgh Coke & Chemical Co. are in heavy demand and "we believe sufficient raw materials will be obtainable to assure full production" in 1947, says J. H. Hillman Jr., president, in his annual report. Stressing the diversity of the company's products which range from pig iron to cement, Mr. Hillman outlined the firm's record in 1946 and sketched proposed activities for this year.

A product developed in 1941, activated carbon, is being manufactured in increasing volume and is finding new application particularly in the plastics field. The firm's lake-shipping activities continue to be profitable and provide adequate facilities for its iron ore requirements. For this year the Pittsburgh company proposes to begin production of phthalic anhydride on a more extensive scale. This year has already seen the sale of the company's ore properties at Iron River, Mich., for $1,500,000.

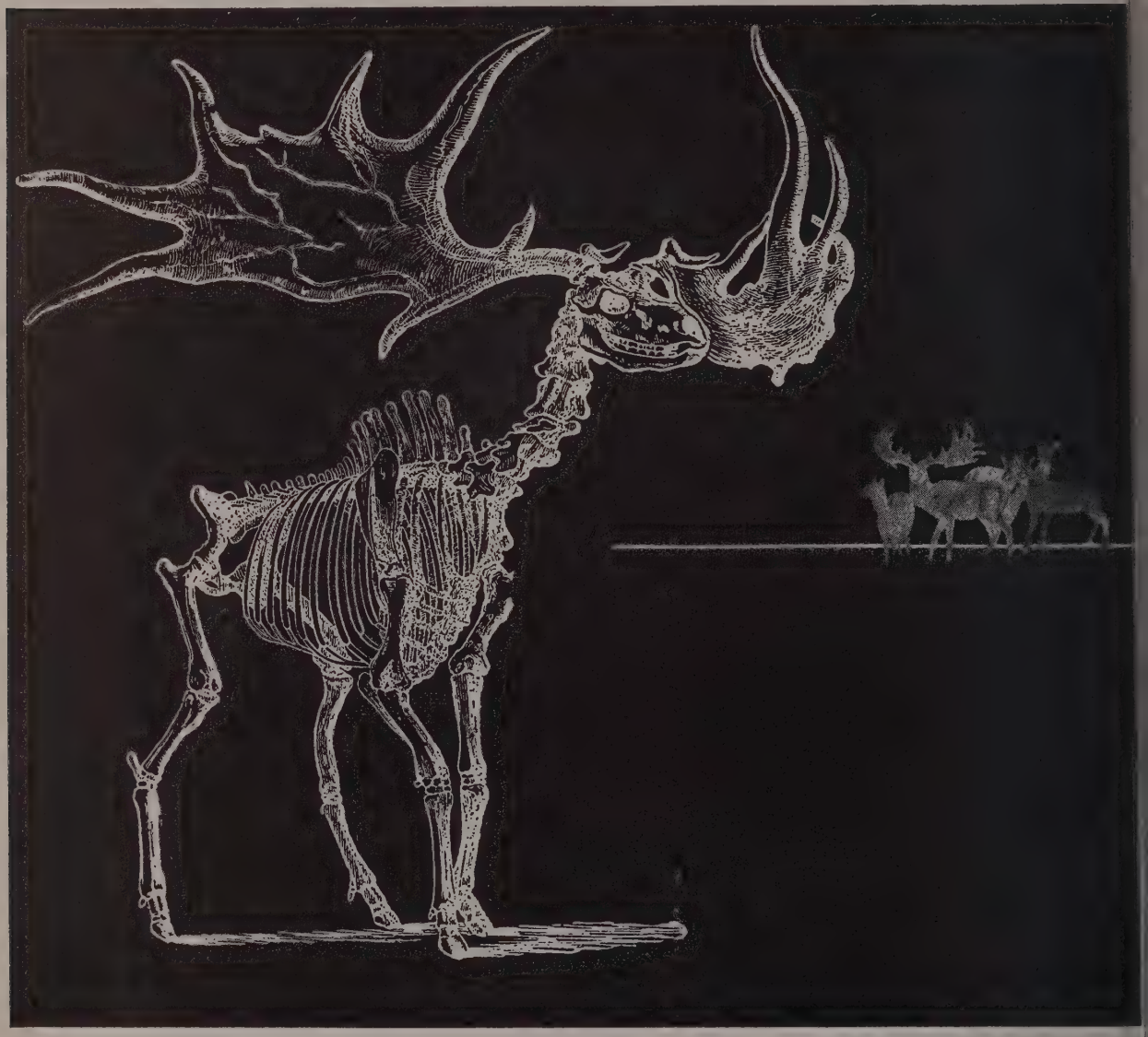
Net profit for 1946 was $806,845 as compared with $302,984 in 1945. The 1946 net income included $213,962 refund of prior years' taxes.

THE ELK THAT ALSO RAN

Once upon a time an enormous elk with out-size antlers roamed the Irish forests. He was impressive but impractical; concentration of weight in the wrong place ruined his ability to meet competition.

The same thing can happen in modern machinery. Too much weight, especially in parts subject to rapid operation, can reduce efficiency considerably. The machine may not become extinct, but it won't make many friends.

There is a simple, economical way of avoiding such troubles—specifying molybdenum steels. Their hardenability permits weight reduction with no sacrifice in ability to meet service requirements. Practical data on request.



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CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

Climax Molybdenum Company
500 Fifth Avenue · New York City

MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Financial wizardry of William C. Durant recalled as organizer of General Motors dies. Won and lost many fortunes in early days of automobile industry. Initials still engraved in cornice stones of General Motors building

DETROIT

DEATH of William C. Durant at the age of 85 last week revived conversations of his financial wizardry in organizing General Motors in 1908 and of the 12 hectic years which followed until he lost control of the corporation for the second and last time. While the true account of his operations during these early years of the automobile industry probably never will be written, the details that can be pieced together read today like a dime-store novel or Daddy Warbucks cartoon strip.

Born in Boston, Durant moved at an early age to Flint, Mich., where he worked with a wagon manufacturer, and by the time he was 42, had organized Buick with a capital of $10 million. He correctly assessed the future expansion of the automobile industry, and both in 1908 and 1909, made efforts to consolidate with Ford. The first time he wanted to bring Ford, Maxwell, Reo and his own Buick company together, but Ford and R. E. Olds wanted $3 million cash each, and even this sum was too much for Durant who at that time had not quite reached the stage where he had ten telephones on his desk and talked in terms of multimillions.

GM Organized in 1908

General Motors was organized by Durant and banker associates under New Jersey laws in the fall of 1908 as a holding company which at once set out to buy controlling interests in some 20 automobile and accessory companies. In 1909 the GM board authorized an offer of $8 million for the entire capital stock of Ford, with $2 million down payment in cash. Ford, however, held out for more cash and the deal fell through.

By 1910 the perpetually-optimistic Durant was becoming hard-pressed for funds to continue his expansion plans, and after a disappointing search was forced to step out of the management to make way for eastern bankers who supplied the money. This bothered him little, for he went back to Flint and organized the Chevrolet Co. which in 15 months showed assets of over $90 million and could not turn out its Baby Grand touring cars and Royal Mail roadsters fast enough to suit buyers who waited with cash in their hands.

Next came one of the neatest financial stunts in history. Durant incorporated Chevrolet in Delaware with capital of $80 million and started offering trades of five shares of Chevrolet for one General Motors. The GM stock certificates started rolling by the basketful, and shortly the offer was reduced to four for one. At the 1915 fall meeting of GM stockholders, Durant wheeled in his baskets of certificates and made the offer to have Chevrolet taken into the GM organization. This was politely declined, whereupon he produced proof of his control of a stock majority and once more was in the saddle, his new smaller company having swallowed up the corporation from which Durant had been squeezed out only five years before. Later there was dispute over whether he actually had enough stock for a controlling interest, some maintaining it was only about 40 per cent, but whether he did or not, at least his act went across and a dividend of $50 per share was declared on GM stock. The latter was a tremendous break for Durant, since it had cost him plenty to buy up the controlling interest.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,082*	84,109
March		140,738
April		248,108
May		247,620
June		216,637
July		331,000
August		359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* *Preliminary.*

Estimates for week ended:

Mar. 1	105,175	17,575
Mar. 8	104,378	23,050
Mar. 15	104,749	35,020
Mar. 22	105,000	37,285

It was just before he acquired control of GM for the second time that Durant in his leisure moments started assembling various parts and accessory companies into the United Motors Corp. One of the units was Hyatt Roller Bearing, whose president, Alfred P. Sloan Jr., was greeted with an offer of $15 million from Durant before he had time to open his mouth to name a selling price of $3 million.

So, with Durant once again back at the helm, GM reorganized from a holding company to an operating company, and went on with its expansion plans during the years of World War I. Around 1920, when wartime liquidation of inflated prices set in, automobile production schedules were being canceled and inventories were piling high. General Motors found itself with money trouble and had to sell 3,200,000 shares of stock at $20 to bolster its capital. Durant kept buying despite the prices, and his street loans mounted dangerously. Still he kept on borrowing and buying, to the extent that he probably did not know himself how much he owed, although the amount is said to have approached $35 million.

Toppled in 1920

Late in November, 1920, the house of cards toppled and the DuPont interests took over Durant's holdings, with the assistance of J. P. Morgan & Co. "Billy" walked out for the last time, but in Detroit it was too late to remove the cornice stones engraved with the large "D" which were already in place on the new General Motors building. They are still there.

Durant was only 59, and by no means through. He organized the Durant Motors Inc. with a capital of $5 million and in less than a year had orders for $31 million worth of Durant cars. The operation skyrocketed for nine years, Durant meanwhile continuing extensive operations in General Motors stock. It is said that in one six-month period he netted $20 million from such dealings. When the stock market bubble popped, his world again came tumbling down and by 1936 he had filed bankruptcy claims.

Prior to the last war, he started construction of bowling alleys in Flint, seeking to promote healthful recreational activities for young people featuring nonintoxicating beverages. The old Durant, however, was gone. His telephones stopped ringing and the wires to the big board in New York no longer burned

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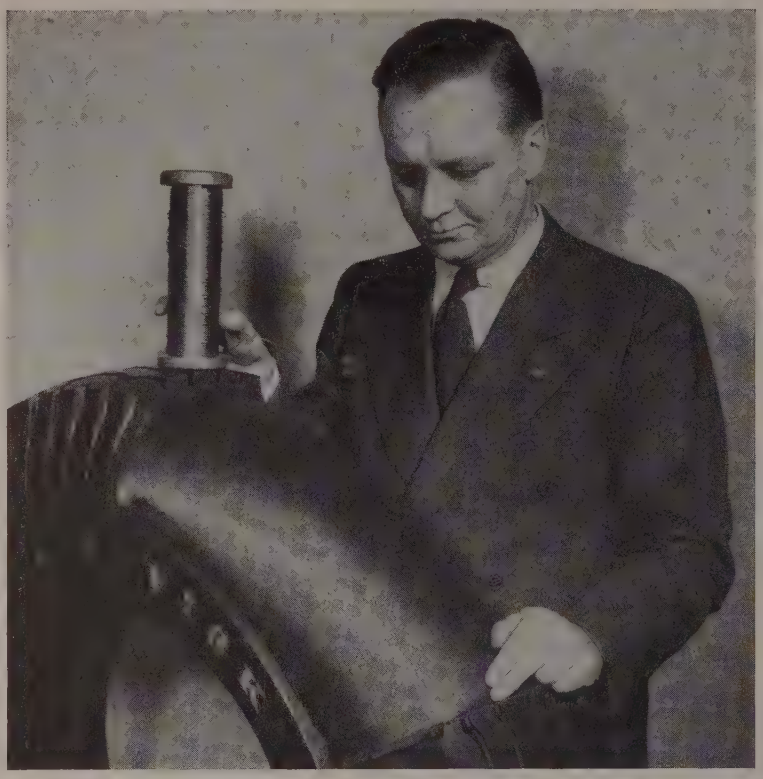


WIRE STRENGTHENS TIRE: Steel wire is used in this experimental tire developed by the United States Rubber Co. for use on heavy trucks. Strength of the steel makes tires more resistant to blowouts, while the use of fewer plies results in a cooler running carcass. Tire in photo has been cut away to show top ply of wire cord. Holding a spool of wire is Arthur E. Benson, development engineer for U. S. Rubber

with his diverse instructions. His health failed late in 1942, and since that time he has lived in comparative seclusion, doubtless contemplating the joys and sorrows of an era that can never return to this country.

The labor troubles of the past ten years bothered him, even though he had no part in them. He once stated publicly, "In my time I built 67 factories and I've operated plants in 75 cities. I have never had a strike."

See Trend to Smaller Cars

Looking back to the gay days of 1929 and its sad aftermath, automotive observers are wondering if they cannot read a pattern which might fit the present. At that time, for instance, the elaborate Duesenberg was being built in this country and sold for $8700 each, chassis only and body extra. Buyers snapped up the 25 per day production and hundreds more could have been sold easily if facilities for their manufacture had been available. After the market crash, there were no Duesenberg buyers left at any price and the venture folded.

Applying the reasoning to today's picture, it is conceivable that as retail prices mount, already 60 per cent beyond 1939 with indications of still further boosts, the tendency of the average buyer will be to move down a notch in price class, assuming his income does not move up apace. If he finds his former $2000 car now is priced at $3500, he may switch makes and plan to buy a former $1200 car, now priced at $2100. He will sacrifice the deluxe appointments and the "swish" ride in favor of conserving cash, reasoning that after all today's automobiles, from the least to the most expensive, all provide pretty good appearance, dependability and performance.

Granting such an eventuality, the outlook for higher priced models becomes precarious, not at the moment but at the time buyers become more price conscious. By the same token, the prospects for the smaller and less expensive cars become the brighter. So what should the manufacturer do?

Several courses seem logical. One is to avoid spending excessive amounts of money on retooling the lower-priced lines, since it may be assumed they will sell regardless. Another is to concentrate on improving style and mechanical details of the higher-priced models in the interests of holding onto buyers who might otherwise drop to a lower price level. Still a third, but costly, procedure might be to engineer a new model out of which has been sweated every single dollar that can reasonably be spared, so that the selling price will be under, by an appreciable amount, anything on the market today. This would appear to be a valuable prop for any company which blankets the field, since the buyers of the present lowest-priced series would have a still lower level to drop to if they balked at paying the currently inflated prices.

All of this involves some pretty deep long-range thinking and planning but it may be more important than it appears at this juncture. There is no concrete evidence of any significant decisions having been reached, other than perhaps General Motors' cancellations of a die program for lower-priced body styles in three makes and concentration of styling changes on larger models. Possibly the decision of Packard to discontinue its 6-cylinder models and to introduce three new eights with completely revised styling, also fits in with the long-range view. Packard's problem, not much different from those of all the smaller-volume producers, is how to amortize heavy tooling costs over limited production without pushing price too far. To that problem, there appears to be no easy solution.

Taxes Are Obstacle

James D. Mooney, Willys-Overland president, told a Chicago technical audience last week that high taxes, personal and corporate, are one of the principal impediments to increasing production. He said, as a result, we are tending "to destroy the units or groups from which we must collect the taxes because the rates have been pushed above an economic level—one of the oldest and simplest lessons in the relations of government to industry."

Mooney mentioned another hurdle—the fact that industry has become "absolutely mad about direct labor costs and has thus neglected overhead costs . . . for example, we take a step forward by changing from six-spindle to eight-spindle automatics. We thus save money out to the fourth decimal point per piece. But then we do such poor production planning that those highly efficient eight-spindle automatics are left idle half the time."

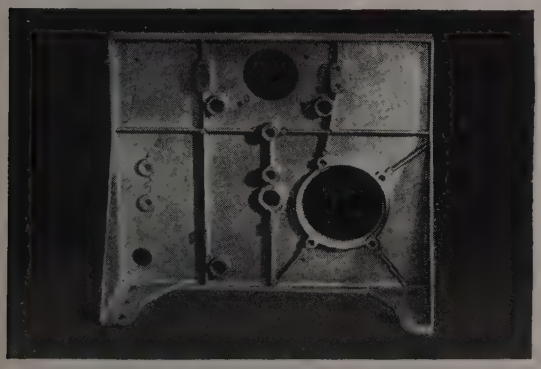
RIBS OR FINS PROVIDE MANY ADVANTAGES

In designing die castings, do not overlook the advantages to be gained through the judicious use of ribs or fins. In addition to providing added strength and stiffness, ribs can:

1. Minimize distortion
2. Reduce weight through the use of thinner sections
3. Promote the proper flow of metal in the die
4. Distribute stresses over larger areas

Several zinc alloy die castings are illustrated here to indicate the variety of ways in which ribs are employed. First, consider the above drawing. These two castings are employed in lawn mower assemblies where strength is a primary consideration. The use of heavy ribs and peripheral flanges (which are ribs in effect) provide the necessary strength with a minimum amount of metal and weight. Fairly light bosses are employed since they are strengthened by the ribs and flanges.

Another interesting example is the angle bracket for an aviation testing device shown in the photograph below. This casting is kept quite light and very rigid by good ribbing and, here again, the ribs provide added strength for bosses.



ALLOY SELECTION

Good die casting design is of no avail unless the proper alloy is selected. Furthermore, it is imperative that any alloy used in die casting production be carefully formulated with respect to every element involved to insure maximum mechanical properties and dimensional stability. If a zinc alloy is used, your die caster should provide one of those shown in the table below. These alloys are covered by specifications of the American Society For Testing Materials and the Society of Automotive Engineers.

Composition of Zinc Alloys For Die Castings

Composition* % by Weight	ZAMAK†-3 A.S.T.M.-XXIII S.A.E.-903	ZAMAK†-5 A.S.T.M.-XXV S.A.E.-925
Copper	.10 Max.	.75 to 1.25
Aluminum	3.5 to 4.3	3.5 to 4.3
Magnesium	.03 to .08	.03 to .08
Iron, Max.	.100	.100
Lead, Max.	.007	.007
Cadmium, Max.	.005	.005
Tin, Max.	.005	.005
Zinc	Remainder	Remainder

*Composition as provided in A.S.T.M. and S.A.E. Specifications. The Zamak alloys meet these specifications but are held within closer limits as to composition.
† A trade mark (registered in the U. S. Patent Office) identifying the zinc alloys developed by The New Jersey Zinc Company and used in the die casting industry.

For additional data on die casting design ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting".

Send for your copy ➡

The New Jersey Zinc Company, 160 Front St., New York 7, N. Y.

ZINC FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

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Expansion Progressing At Thomas Steel

Annual report outlines $900,000 modernization project and sketches firm's history since its organization in 1920

MORE THAN half of a $900,000 construction and modernization program was completed in 1946 by the Thomas Steel Co., Warren, O., and prospects are bright for early termination of remaining commitments, C. H. Lewis, chairman, and E. M. Barber, president, state in their annual report to shareholders.

Construction was completed or substantially under way during 1946 of additional annealing furnaces, a machine shop with supplementary machine tools to equip it, a new tempering furnace, an industrial relations office building and a 600 hp boiler to be housed in a remodeled boiler facility. The latter project was about half completed at the end of the year.

The report also outlines changes in the management and financial set-up of the company which were coincident with the retirement of C. G. Thomas in April, 1946. At that time Messrs. Lewis and Barber were elected to their present positions. Last November the common stock of the company was listed on the New York Stock Exchange for the first time.

Firm Was Originally a Foundry

Organized in 1920, the Thomas company acquired properties of the McMyler Interstate Co. which operated a foundry and machine shop. Foundry operations were ended in 1923 when Thomas began the manufacture of cold-rolled strip steel. Initially the company made only plain cold-rolled strip, but in 1928 it started to electroplate cold-rolled strip steel and since then has added numerous coated steel products to its line.

Products, which are made according to purchasers' specifications, include uncoated cold-rolled strip steel, strip steel electrocoated with either zinc, copper, nickel, brass or special alloys, strip steel with a hot dipped coating of tin or solder, strip steel with clear or colored lacquer coatings and tempered or untempered strip. The company has undertaken a research program with special emphasis placed in the field of specialized electroplated strip steel.

Net earnings of the company for 1946 were $1,066,630, which compare favorably with its record in 1941, peak prewar year. Because of government restrictions and allocations, Thomas' business and profits were down during the war years. The company has shown a profit for every year since 1926.

Westinghouse To Hasten Atomic Energy Applications

Co-ordination of the research, engineering and manufacturing activities of Westinghouse Electric Corp. in a broad program to hasten such application of atomic energy as ship propulsion and generation of electricity is disclosed in the company's annual report to stockholders.

M. W. Smith, vice president in charge of engineering, heads a group to co-ordinate and advance all atomic energy research within the company. In addition to the activity in its own plants and laboratories, a dozen Westinghouse scientists have been assigned to government-sponsored laboratories where research and experimental work is being conducted in the development of atomic energy.

Sterling Products Co. Triples Facilities With New Plant

Sterling Tool Products Co., manufacture of portable sanding machines, will build a plant in Melrose Park, Ill., which will triple its present facilities, S. A. Crosby, president, has announced. The one-story combined factory and office will contain 95,000 sq ft of floor space.

GEORGE F. HOLLAND

Election of George F. Holland as president of the Union Twist Drill Co., Athol, Mass., recently was announced. He formerly was general manager of the company's Butterfield Division with plants at Derby Line, Vt., and Rock Island, Que.

Stress Research In Report by Foundry Firm

National Malleable's 1946 report outlines company's industrial development record extending over 53-year period

IN HIS 1946 annual report, Cleve H. Pomeroy, president, National Malleable & Steel Castings Co., Cleveland, placed particular emphasis on the importance of research and development work in the foundry industry.

Stating that "a company which fails to carry on its fair share of research . . . cannot hope to rank as a leader," Mr. Pomeroy outlined his firm's record.

This dates back 53 years when National introduced an automatic coupler for railroad cars, the first successful, entirely automatic coupler which could be operated without the dangerous practice of going between the cars.

A line of products of recent origin for National is in the mine equipment field where many specialties have been introduced which are required in the mechanization of the mining industry. Still another product pioneered by National is cast steel, heavy-duty marine chain, in which links are cast around other links. This was a new departure when this chain was introduced during World War I. National is one of the two manufacturers in this country of a railway wheel featuring a rubber "sandwich" within the wheel itself which serves to dampen noise and vibration.

Pioneered in Research Laboratories

National set an industry precedent 35 years ago by establishing a research division with a well equipped metallurgical laboratory. The company's research in formulae for steels eventually led to intermediate manganese steels. National's studies had an important influence on the specification and composition of steels used in tanks and for other war purposes during the recent conflict, according to Mr. Pomeroy.

Sales in 1946 for National Malleable and Steel Castings Co. were the largest for any peacetime year since 1920, reports Mr. Pomeroy. A volume of $29,824,800 showed a net profit of $992,770.

The firm has a $2,400,000 program under way, to modernize its Indianapolis plant, has purchased $375,000 worth of equipment for its Cicero plant in Chicago, and has approved an additional appropriation of $325,000 for equipment at its Sharon facility.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Hydro-Power Inc., Springfield, O., manufacturer of hydraulic power units, has named Joseph C. Tourne, General Engineering & Equipment Corp., New Orleans, regional sales manager for the southern district. The following have been appointed dealers: American Machinery Corp., Orlando, Fla., for Florida; Jack Fanning, Atlanta, for Georgia; Ridwell Engineering Co. Inc., Birmingham, for Alabama; Southern Engineering & Supply Co., Vicksburg, Miss., for Mississippi; D. B. A. Engineering Co., Houston, Tex., for Texas.

—o—

Philco Corp., Philadelphia, has started delivery on three new radios, which are two console radio-phonographs and an AC-DC table model.

—o—

Accurate Spring Mfg. Co., Chicago, maker of springs, wire forms and stampings, following a fire which severely damaged its main plant, has resumed operations at 1474 W. Hubbard St.

—o—

Heating Specialties Co., Arbutus, Md., plans to begin manufacture of oil and gas-fired warm air furnaces.

—o—

Allison Division, Indianapolis, General Motors Corp., has taken over complete responsibility for Army Air Forces' J-33 jet engine, originally developed by General Electric Co.

—o—

Davison Chemical Corp., Baltimore, has acquired from War Assets Administration a plant in Cincinnati where the company will manufacture a synthetic cracking catalyst used in gasoline production. The plant was operated during the war by Diakel Corp., Cincinnati.

—o—

Monsanto Chemical Co., St. Louis, has renewed for the third year its contract with the University of Illinois wherein Monsanto provides funds for a research program on the dynamic fatigue characteristics of plastics.

—o—

Lord Mfg. Co., Erie, Pa., maker of mountings, couplings and other bonded rubber products, has opened a field office in Providence, R. I., with Dan Rowan in charge.

—o—

Rollway Bearing Co. Inc., Syracuse, N. Y., has moved its Chicago office to 20 N. Wacker Dr.

—o—

Twin Coach Co., Kent, O., has deferred production of its intercity type coach until early 1948 in order to concentrate on the manufacture of urban type busses.

—o—

DeSoto Oil Burner Corp., York, Pa., has added a domestic oil-burning water heater to its line of oil-burning heater units.

—o—

Luria Steel & Trading Corp., New York, has opened offices in Little Rock, Ark., with Norman J. Siegel as district manager.

—o—

General Electric Co., Schenectady, N. Y., paid $114,100 last year to employees whose ideas for improved plant and office operations were adopted.

—o—

Detroit Steel Products Co., Detroit, is sold out for the remainder of the year for its output of automobile springs. Production of building panels and roof deck has been taken for the next six months. The firm is quoting third quarter delivery for window sash.

—o—

Hannifin Mfg. Co., Chicago, maker of riveting equipment, has changed its corporate name to Hannifin Corp. General offices have been moved to 1101 S. Kilbourne Ave.

—o—

Balmor Corp., Woodberry, Md., manufacturer of operating devices for steam locomotives, will begin production this summer of equipment for the prefabricated housing industry. The company is now doubling its electric steel foundry capacity.

—o—

Electric Machinery Mfg. Co., Minneapolis, has commissioned Hesler Co., Kansas City, Mo., as a distributor for its line of motors and generators.

—o—

Robins Conveyors Division, Hewitt-Robins Inc., Buffalo, has consolidated its Birmingham office with that of Hewitt Rubber Division and the office is now located at 615 N. Ninth St., Birmingham 4.

—o—

All American Aviation Inc., Wilmington, Del., will manufacture component parts of rafter assemblies for W. H. Harman Corp., Philadelphia, developer of an all-steel, factory-assembled house.

—o—

R. G. LeTourneau Inc., Peoria, Ill., has formed Tournalayer Sales Division to sell and service the firm's machine for building concrete houses. Richard L. LeTourneau will head the division which has its production and sales headquarters at Longview, Tex.

—o—

Minneapolis-Honeywell Regulator Co., Minneapolis, and its industrial division, Brown Instrument Co., Philadelphia, have opened a district office at East Orange, N. J.

—o—

War Assets Administration has called for new bids for the purchase of the war surplus Wilkeson coke plant and coal properties at Tacoma, Wash. First bids submitted Dec. 30 were rejected. Built in 1943 at a cost of $950,000, the plant has an annual capacity of 75,000 tons of coke.

—o—

War Assets Administration has sold a plant at Portland, Oreg., to H. F. Dick for $105,000. Separate bids will be invited for $700,000 worth of equipment.

—o—

Cosa Corp., New York, announces it is the United States representative for George Fischer Steel & Iron Works Ltd., Schaffhausen, Switzerland, manufacturer of lathes.

—o—

Great Lakes Steel Corp., Detroit, has licensed Sharon Steel Corp., Sharon, Pa., to produce N-A-X high tensile steel and the entire range of N-A-X 9100 series low alloy steels.

—o—

Kilby Steel Co., Anniston, Ala., has started production of farm equipment for J. I. Case Co., Racine, Wis.

—o—

Pullman-Standard Car Mfg. Co., Chicago, has received an order for 47 sleeping cars which will be operated jointly by Missouri-Pacific and Texas & Pacific railroads. Aluminum alloy will be utilized for the superstructure.

—o—

Mercury Mfg. Co., Chicago, manufacturer of industrial trucks, tractors and trailers, announces the following additions to its sales organization: Star Machinery Co., Seattle, for Washington and Oregon and E. L. Harrington, Boston, for Maine, New Hampshire, Vermont, Rhode Island and Massachusetts.

—o—

Carboloy Co. Inc., Detroit, manufacturer of cutting tools, has named Hansen & Yorke Co., New York, as distributor.

—o—

Electric Welding Co., manufacturer of concrete reinforcing materials, will move its plant and equipment from McKees Rocks to Canonsburg, Pa. Its offices remain in McKees Rocks, but have been moved to a new city location in the Keystone Hotel Bldg.

The Business Trend

Strengthening Noted In Industrial Activity

NEW POSTWAR levels of steel ingot output strengthen the already high industrial production rate and at the same time give promise that vitally important steel will be available for maintaining a high plane of industrial activity.

In reflecting the slightly faster pace, STEEL's industrial production index for the week ended Mar. 15 touched 161 per cent (preliminary) of the 1936-1939 average, compared with 160 (revised) in the week ended Mar. 8. If final figures permit the 161 per cent to stand, a new postwar high will have been recorded.

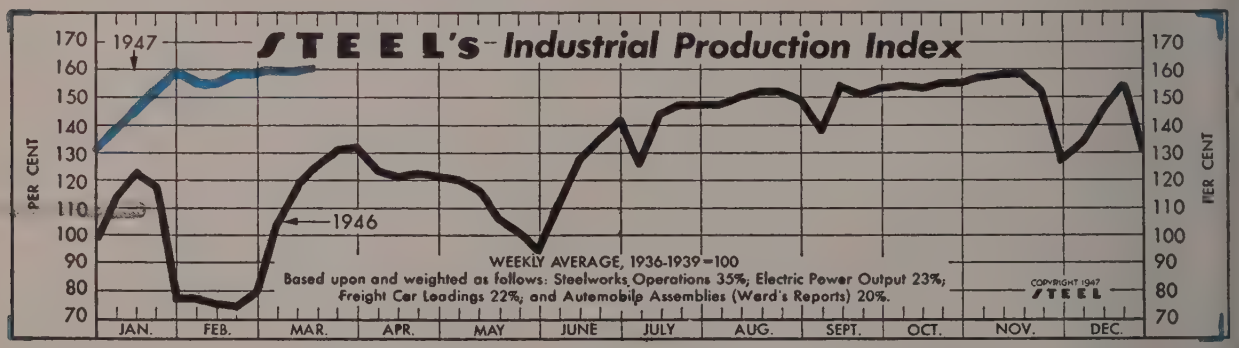
AUTOS—Contributing importantly to the high index of industrial activity is automobile output. In the week ended Mar. 15, estimated production of passenger cars, trucks and busses was 104,749 units, up slightly from the preceding week's 104,378 and only slightly below the postwar high of 105,175 produced in the week ended Mar. 1. Current indications are that the auto industry will not be able during the rest of this month to increase its rate of output appreciably above the current scale. Sheet steel appears to be the most critically short of the scarce metal stocks and components, although a dearth of copper imposes a threat to high production later in the year.

COAL—Production of bituminous coal declined slightly in the week ended Mar. 8, the estimated yield being 12,775,000 tons, compared with 12,875,000 in the preceding week. However, aggregate output this year through Mar. 8 was 2 per cent ahead of that for the corresponding period of last year.

PRICES—Commanding wide attention is the upward trend of prices. After a slight decline and leveling off at the end of January, the wholesale price index of the U. S. Bureau of Labor Statistics started a climb that is yet unbroken. In the week ended Mar. 8, the index rose 1.6 per cent and reached 148.7 per cent of the 1926 average. The latest increase resulted from advances in all commodity groups, with sharp increases for agricultural products, and put the index at the highest level since late 1920.

DURABLE GOODS—Indexes of inventories, shipments, and new orders in the durable goods manufacturing industry continued to rise in January, the rise said to be due largely to increased dollar value. Value of all manufacturers' inventories, durables and nondurables, reached a new all-time high of $20.6 billion at the end of January, a $350 million increase over December. The January increase resulted from about equal advances in the dollar value of inventory held by both durable and nondurable goods industries.

CONSTRUCTION—Costs of construction continue to rise, acting further to discourage new building. This upward trend pushed the construction cost index of the Associated General Contractors (all types) in February to 280 per cent of the 1913 average, up three points over January and 35 points over February, 1946.



The Index (see chart above): Latest Week (preliminary) 161 | Previous Week 160 | Month Ago 157 | Year Ago 126

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)‡	95.0	93.0	93.5	84.5
Electric Power Distributed (million kilowatt hours)	4,764	4,787	4,778	3,988
Bituminous Coal Production (daily av.—1000 tons)	2,129	2,146	2,050	2,176
Petroleum Production (daily av.—1000 bbls.)	4,844	4,824	4,758	4,415
Construction Volume—(ENR—Unit $1,000,000)	$103.3	$127.9	$54.8	$74.8
Automobile and Truck Output (Ward's—number units)	104,749	104,378	97,276	35,020

* Dates on request. ‡ 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

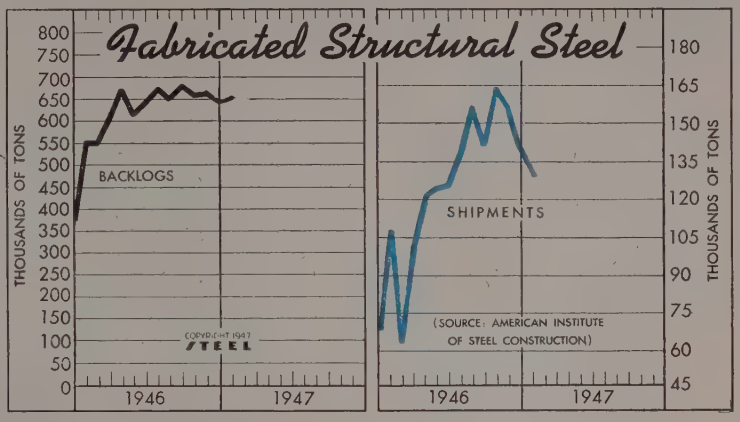
TRADE				
Freight Carloadings (unit—1000 cars)	825†	806	800	799
Business Failures (Dun & Bradstreet, number)	51	58	62	17
Money in Circulation (in millions of dollars)‡	$28,330	$28,335	$28,346	$27,946
Department Store Sales (change from like week a year ago)‡	+9%	+10%	+2%	+14%

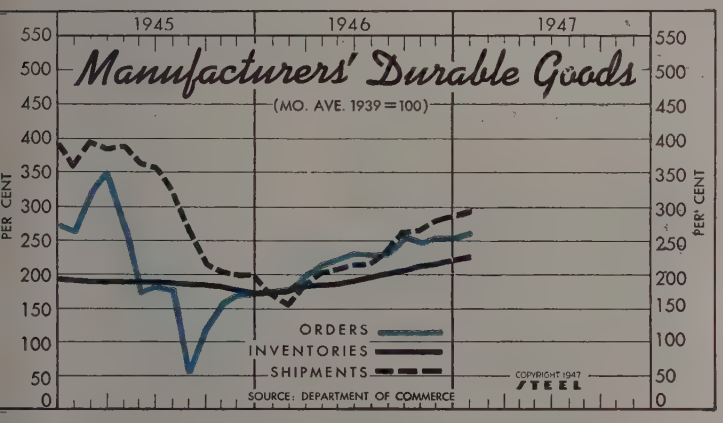
† Preliminary. ‡ Federal Reserve Board.

Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1947	1946	1945	1947	1946	1945
n.	126.9	107.5	57.0	661	552	124
eb.	....	63.8	49.0	...	551	152
lar.	....	102.8	59.5	...	605	153
pr.	....	122.5	62.8	...	674	163
lay	....	124.4	72.6	...	615	166
une	....	126.8	69.2	...	642	195
ly	....	140.2	69.9	...	674	194
ug.	....	157.5	70.6	...	651	201
ept.	....	141.9	63.4	...	682	248
ct.	....	164.7	76.6	...	660	283
ov.	....	157.3	78.0	...	665	305
ec.	....	142.1	68.8	...	646	375
otal	....	1,551.6	797.4	...	...	...





Index of Manufacturers' Durable Goods

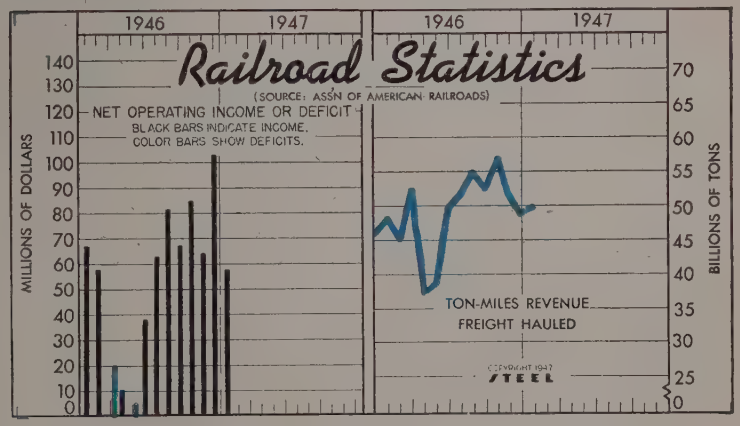
(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1947	1946	1947	1946	1947	1946
Jan.	268	176	294	169	225	171
Feb.	...	179	...	153	...	174
Mar.	...	203	...	183	...	181
Apr.	...	219	...	203	...	182
May	...	224	...	207	...	184
June	...	231	...	212	...	189
July	...	229	...	216	...	195
Aug.	...	232	...	233	...	200
Sept.	...	254	...	259	...	206
Oct.	...	248	...	262	...	211
Nov.	...	254	...	278	...	216
Dec.	...	263	...	290	...	221
Ave.	...	226	...	222	...	194

Statistics of Class I Railroads

	Net Operating Income			Ton-Miles Revenue Freight		
	millions			billions		
	1947	1946	1945	1947	1946	1945
n.	$57.7	$66.7	$76.0	50.0	48.2	56.8
eb.	...	57.8	74.7	...	45.1	55.4
ar.	...	*20.5	102.0	...	52.8	64.4
pr.	...	10.1	95.1	...	37.0	61.4
ay	...	* 4.8	103.6	...	39.0	64.2
ne	...	38.1	99.9	...	50.0	62.6
ly	...	62.8	98.8	...	51.5	60.7
ug.	...	81.7	87.5	...	55.0	56.8
pt.	...	67.4	43.1	...	52.7	52.6
ct.	...	85.1	52.4	...	57.0	49.8
ov.	...	64.1	60.7	...	51.5	49.8
ec.	...	103.0	42.0	...	49.0	46.3
ve.	...	$50.9	$78.0	...	49.0	56.7

* Deficit.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,999	$13,988	$9,826	$11,135
Federal Gross Debt (billions)	$260.8	$260.7	$259.4	$278.6
Bond Volume, NYSE (millions)	$17.3	$19.9	$16.4	$23.8
Stocks Sales, NYSE (thousands)	4,808	5,321	5,317	5,923
Loans and Investments (billions)†	$55.4	$55.1	$55.6	$67.7
United States Gov't. Obligations Held (millions)†	$35,301	$34,790	$35,592	$49,231

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.73	$69.73	$69.73	$63.54
All Commodities†	148.7	146.4	141.7	108.2
Industrial Raw Materials†	162.5	158.9	153.1	121.4
Manufactured Products†	143.7	142.0	137.5	103.8

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

RUSSELL J. ALLEN

DR. RICHARD A. FLINN

HARRY M. ST. JOHN

The American Foundrymen's Association, Chicago, has announced that it will award four "meritorious service" gold medals and two honorary memberships at its 51st annual convention to be held in Detroit, Apr. 28-May 1. The four to be awarded the society's medals are: **Russell J. Allen,** metallurgical engineer, Worthington Pump & Machinery Corp., Harrison, N. J.; **Dr. Richard A. Flinn,** metallurgist with the Mahwah, N. J., research group of American Brake Shoe Co., New York; **Harry M. St. John,** brass foundry and forge shop superintendent, Crane Co., Chicago; **Henry M. Washburn,** president, Plainville Casting Co., Plainville, Conn. **John Grennan,** instructor in foundry practice, University of Michigan, Ann Arbor, and **Sheldon V. Wood,** president of AFA and president-general manager, Minneapolis Electric Steel Castings Co., Minneapolis, will be inducted as honorary members of the association.

—o—

William C. Beddoe has been appointed advertising and sales promotion manager, Divine Bros. Co., Utica, N. Y. He will be in charge of advertising, sales promotion, and public relations for all divisions of the company. Mr. Beddoe had previously been associated with the Congoleum Canada Ltd., and with the James Lees & Sons Co., Bridgeport, Pa.

—o—

Michael P. Walker has been appointed general sales manager, Aluminum Solder Corp., New York, and will be responsible for sales, advertising and general promotion of Prolyt, a newly developed aluminum solder.

—o—

Norman A. Kelsey, Central Iron & Steel Co., Harrisburg, Pa., has been transferred from the company's New York district office to be district sales manager of the New England territory. He will have his headquarters in Boston. Mr. Kelsey succeeds **W. A. Hill** who has been appointed district sales manager at Philadelphia. **Robert M. Schein** has become associated with Central Iron & Steel as a member of the New York district organization, and will cover the New Jersey territory. He was formerly with Wilkoff Steel Corp., and more recently with Marx-Segre Co.

—o—

F. L. Hopkinson has been appointed executive vice president, Graham-Paige Motors Corp., Willow Run, Mich., and of Graham-Paige International Corp. He had formerly been vice president and a member of the board of Willys-Overland Motors Corp., Toledo, O.

—o—

Julius P. Heil, former governor of Wisconsin, has been elected chairman of the board of the Heil Co., Milwaukee, to succeed the late **Herman W. Falk.** He also continues as treasurer of the company. Newly elected directors of the Heil Co. are **J. P. Pulliam,** president of the Wisconsin Public Service Corp., and **Harold F. Falk,** vice president of the Falk Corp.

HENRY M. WASHBURN

—o—

H. E. Williams has been promoted to eastern regional sales manager, Heating Controls Division, Minneapolis-Honeywell Regulator Co., Minneapolis.

—o—

John H. Emery has been elected vice president and sales manager, Roberts & Mander Corp., Hatboro, Pa. He was formerly manager of the company's New York office.

—o—

Donald MacGregor has been named vice president in charge of production, Zenith Radio Corp., Chicago. He was formerly executive vice president and general manager of Webster-Chicago Corp., Chicago.

—o—

Elmer D. Eades has been appointed southern regional manager, RCA Victor Division, Radio Corp. of America. His headquarters will be in Atlanta.

—o—

John S. Pingel has been named advertising manager of Reo Motors Inc., Lansing, Mich.

—o—

Edward Hazlehurst has been named technical director, Pantasote Co., Passaic, N. J. He was formerly with the Western Electric Co.

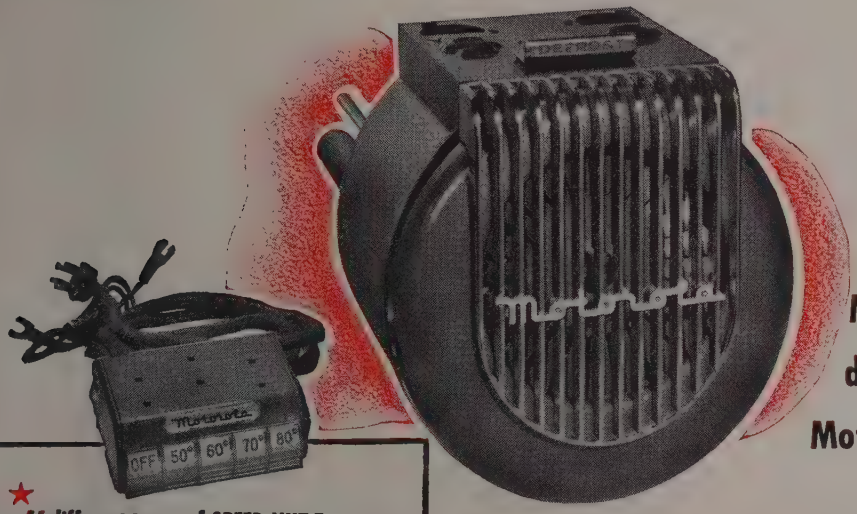
—o—

Elmer L. Spence has been elected president of the Mechanical Packing Association, New York. Mr. Spence, manager of the Packing Department of United States Rubber Co., New York, was formerly a director and chairman of the association's Standards & Customs Committee. **A. W. Swartz Sr.,** Linear Inc., Philadelphia, has been elected vice president, and **F. H. Luhrs,** secretary-treasurer. Directors elected are: **C. A. Pease,**

FOR PROFITABLE ASSEMBLY

Let TINNERMAN *analyze your fastening problems*

BEFORE You Leave the "Mock-up" Stage



Just as the Galvin Manufacturing Corp. did with their new Motorola Auto Heater

★ **These 14 different types of SPEED NUT Fasteners —44 parts in all—solved Galvin's problems**

Our new Bulletin No. 214 goes into detail on this Motorola job and is available for the asking. Since you may be able to use to advantage many of the fastening ideas illustrated, write for a copy today.

To take full advantage of the SPEED NUT System of Fastening, Galvin engineers brought the "mock-up" and prints of their new Motorola Heater to Tinnerman for a fastening analysis *before* building tools and dies. They sat right in with Tinnerman development engineers who went over the heater part by part—explored every possible production short cut—planned its assembly from start to finish.

The final design of the heater was modified to take advantage of *standard* SPEED NUTS wherever possible. Where standards could not be used, new SPEED NUTS were created for a more efficient assembly. The result was *assembly perfection.* Many parts were attached with SPEED CLIPS and merely snapped into position under spring-tension. Others were fastened by simply pressing SPEED NUTS over unthreaded studs. And where it was necessary to use screws, SPEED NUTS made the attachments simple and fast.

This engineering service is available to you, too—at no cost. For the utmost in assembly savings, contact our Sales Engineering Department *before* you leave the "mock-up" stage. But in any event, check the SPEED NUT System of Fastening before you go into production.

TINNERMAN PRODUCTS, INC. **2039 Fulton Road**
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★ **In Canada:** Wallace Barnes Co., Ltd., Hamilton, Ontario
In France: Aerocessoires Simmonds, S.A., Paris
In England: Simmonds Aerocessories, Ltd., London
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

Speed Nuts★

*Trade Mark Reg. U. S. Pat. Off.

PATENTED

FASTEST THING IN FASTENINGS ***MORE THAN 4000 SHAPES AND SIZES***

Endura Mfg. Co., **C. E. Cunningham,** Flexitallic Gasket Co., and **A. R. Byrnes,** Union Asbestos & Rubber Co.

—o—

E. A. Schiele has been appointed representative for the Chicago area of the Steel Improvement & Forge Co., Cleveland. He was formerly associated with the Graver Tank & Mfg. Corp., East Chicago, Ind. **Henry R. Voelker** has been appointed a company representative in the Indianapolis area.

—o—

Lee W. Delhi has been appointed vice president and director, California Steel Products Co., Richmond, Calif. He was formerly associated with the Western Pipe & Steel Co., San Francisco.

—o—

C. P. Doherty, Despatch Oven Co., Minneapolis, has been named factory manager, and **G. L. Schuster,** chief engineer of the company. They also will serve on the board of directors as vice presidents.

—o—

L. E. Thompson has been named manager of the Renewal Parts Division of the Air Conditioning Department, Bloomfield, N. J., of General Electric Co., Schenectady, N. Y.

—o—

Wallace R. Harper, Pittsburgh Plate Glass Co., Pittsburgh, formerly manager of the Boston warehouse, has been named manager of the plate glass sales, Glass Sales Division. He succeeds **John A. Wilson,** a newly appointed vice president of the firm. Other promotions in the company's Merchandising & Glass Sales Divisions include: **William A. Gordon,** manager of trade sales, responsible for all plate glass sales to jobbing and mirror accounts; **Marvin W. Marshall,** manager of industrial glass sales, who will assume direction of plate and safety glass sales to all production accounts; and **Felix T. Hughes,** who has been appointed manager of warehouse sales of plate and safety glass.

—o—

James Hoghland has been appointed assistant Pacific coast sales manager, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. He will have his headquarters at the plant recently purchased by the company from Cooper Screw Co. in Los Angeles. Mr. Hoghland was formerly associated with American Screw Co., Grand Rapids, Mich.

—o—

Gordon J. Wygant, formerly sales engineer, Titeflex Inc., Newark, N. J., has been named assistant sales manager. He will assist in directing the sales and servicing of all Titeflex products. Mr. Wygant worked extensively during the war on the application and servicing of radio shielding harnesses to military aircraft. He joined the Titeflex organization in 1941.

—o—

Joseph H. Rill has been appointed personnel director of Twin Coach Co., and its subsidiary, Fageol Products Co., Kent, O. He had been formerly personnel director of the Marine Division, Federal-Mogul Corp., Detroit, and had, also, been associated with American Brake Shoe & Foundry Co., New York. **R. P. Johnston** has been named assistant to the personnel director.

—o—

John E. Groves has been appointed industrial relations manager, National Radiator Co., Johnstown, Pa. Mr. Groves formerly had been assistant to the executive vice president and industrial relations director of the Standard Steel Spring Co., Coraopolis, Pa.

—o—

James L. Turrentine has joined Pitney-Bowes Inc., Stamford, Conn., as a member of the company's public relations staff. He previously held editorial and public relations posts with the Shell Oil Co. and the Hazard Advertising Co.

—o—

Dr. Reginald M. Jones has been named to head the newly organized Research Division, Liquid Carbonic Corp., Chicago. The reorganization of the corporation's research activities includes the work of three laboratories: **Everett W. Ellicson** supervises the control laboratory, **Ralph Rose** supervises the research laboratory, and **Robert Matthei** heads the work of the industrial laboratory.

—o—

Norman M. Schaefer has been appointed advertising manager of Ohmer Corp., Dayton, O., subsidiary of Rockwell Mfg. Co. He has been associated with the company for the past 9 years, and his experience has included many phases of the company's sales and promotion activities. He succeeds **C. J. Proud,** who has resigned to become national field representative with the Advertising Federation of America.

—o—

President Truman has appointed **Vice Admiral Donald B. Duncan** to the National Advisory Committee for Aeronautics. Vice Admiral Duncan has assumed new duties as deputy chief of naval operations for air, following a tour of duty as chief of staff to the Commander.

—o—

A. S. Capron Jr. has been appointed sales representative in the Wisconsin territory for the United States Steel Wire Spring Co., Cleveland. He will have his headquarters in Milwaukee.

—o—

Marc Laibe has been named assistant purchasing agent for Goodyear Tire & Rubber Co., Akron. He has been associated with the firm since 1945.

—o—

J. A. Thomas has retired as president of the Liquid Carbonic Pacific Corp. Ltd., Los Angeles, subsidiary of Liquid Carbonic Corp., Chicago. He had been associated with the corporation and its subsidiary for the past 33 years. **H. C. Mathey** has been named as general manager of the Pacific corporation. He had been dry ice sales manager in New York for the Liquid Carbonic Corp. **P. F. Lavedan,** president of the parent company, has been named as president of the Pacific company to succeed Mr. Thomas.

—o—

American Gear & Mfg. Co., Chicago, has announced the election of the following officers: **Warren J. Kilburn,** president; **Maurice P. Collins,** vice president in charge of manufacturing; **John J. Fajnor,** vice president in charge of sales and advertising; **Alan B. Gilbert,** vice

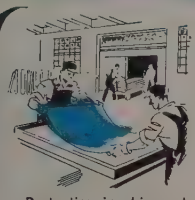
DR. REGINALD M. JONES

H. C. MATHEY

Need Protection for Polished Stainless?

. . . EASTERN HAS A NEW ANSWER!

"Liquid Envelope" gives stainless sheets:



Protection in shipment

Protection in storage

Protection during fabrication

Now you can get Eastern Stainless Steel sheets whose finish won't be marred in shipment . . . in storage . . . in handling . . . or even during fabrication! Eastern is the first in the field with an answer to the costly problem of refinishing. How? Because Eastern is the first to supply stainless sheets protected by "Liquid Envelope", the strippable plastic film, a coating so tough that the sheets can be cold-formed, even deep-drawn *without marring the finish, and with, in fact, improvement in results due to the lubricating property of "Liquid Envelope."*

You can now purchase polished sheets, shape them on the usual brakes or presses, strip the film, and assemble stainless steel equipment with practically no other finishing! This amazing protection cuts costs for both fabricator and user.

Ask Eastern for the Answer when Stainless is the Question

Stainless protected by "Liquid Envelope" is the answer to many problems of handling finished sheets. *It proves again that it is wise to . . .*

Specify Eastern Stainless Steel sheets with "Liquid Envelope" today. The plastic coating protects your pocketbook while it guards the stainless finish. And, for down-to-earth information about stainless steel sheets and plates, ask for your copy of the handbook, "Eastern Stainless Steel Sheets."

JM Lco E:C1

EASTERN STAINLESS STEEL CORPORATION

BALTIMORE 3, MARYLAND

president in charge of engineering; **Henry A. Bourne,** secretary; and **Alwin M. Seavey,** treasurer.

—o—

Ralph LiBeau has been appointed general purchasing agent of the Bassick Co., Bridgeport, Conn., division of Stewart-Warner Corp. He joined the company in 1945 as sales manager of the Automotive & Specialty Hardware Division. During the war he was associated with North American Aviation Inc., Kansas City, Mo.

—o—

Henry J. Lucey, sales manager, Oil-Extraction Division, Detrex Corp., Detroit, has been named to handle the foreign correspondence and export sales for the company.

—o—

Lee W. Kinney has been appointed distribution manager for the Liquid Carbonic Corp., Chicago, to succeed **Frank B. Andrews,** who recently was appointed production manager of the corporation's Bottlers' Machinery Division. He had previously been associated with the White Motor Co., Cleveland.

—o—

Richard Graybill has been appointed assistant eastern division manager of General Tire & Rubber Co., Akron. He had formerly been territory representative in the New York office.

—o—

The 1946 Lamme Medal of the American Institute of Electrical Engineers has been awarded to **John B. MacNeill,** manager of the Switchgear & Control Division, Westinghouse Electric Corp., Pittsburgh. The medal will be presented at the summer general meeting of the Institute, to be held in Montreal, Que.

—o—

Edward F. Dykstra, formerly associated with Standard Safety Equipment Co., Chicago, has been appointed advertising and sales promotion manager of D. A. Stuart Oil Co., Chicago.

—o—

Henry Rowold has been appointed assistant general sales manager of Mack-International Motor Truck Corp., New York. Mr. Rowold, also a vice president of the company, combines his new duties with those of national accounts manager, a position he has held for some time.

—o—

Robert A. Neal, vice president, Westinghouse Electric Corp., Pittsburgh, has been named as general manager of the corporation's West Coast operations, with headquarters in San Francisco. He has been associated with Westinghouse Electric 37 years, and has been a vice president since 1944.

—o—

Frederick V. Roberts has been appointed head of the industrial relations department, Edgewater, N. J., plant of Ford Motor Co. He had previously been plant director of labor relations.

—o—

W. A. Reichel has been elected vice president of Kearfott Co. Inc., New York. He was formerly director of engineering of the Eclipse-Pioneer Division, Teterboro, N. J., of Bendix Aviation Corp.

—o—

Norman G. Turner has been appointed a district manager of Indian Motocycle Co., Springfield, Mass. His territory will consist of Pennsylvania, New York, New Jersey, and Ontario and Quebec, Canada.

—o—

A. E. R. Schneider and **M. B. Hott** have been elected directors of the Cherry Rivet Co., Los Angeles. Mr. Schneider is president of the Schneider Transportation Co., Cleveland, and a director of the A. C. & Y. Railroad. Mr. Hott is president of the Lamel Corp., Cleveland, and director of several companies including the Alliance Mfg. Co., Alliance, O.

—o—

C. W. Kirby has been appointed sales manager of Daystrom Corp., Olean, N. Y. He was formerly sales manager of the Chicago branch of the Frigidaire Division, General Motors Corp.

—o—

A. H. Shonkwiler, assistant general manager, Lackawanna, N. Y., plant, Bethlehem Steel Co., Bethlehem, Pa., has been appointed general manager to succeed the late **E. F. Entwisle.** Mr. Shonkwiler has spent his entire business career in the steel industry. He became associated with Bethlehem Steel in 1935, having previously been with the Wheeling Steel Corp.

—o—

Raymond D. Critzer has been appointed sales engineer for the Cleveland district, Leland-Gifford Co., Worcester, Mass. **A. P. Witteman,** who has been in charge of this territory for the past 11 years, will, on April 1, open the Leland-Gifford Co.'s new Los Angeles office, located in the Corporation Building, South Spring Street.

—o—

Elmer A. Koenig, Yoder Co., Cleveland, has been promoted to the position of assistant sales manager of the company. He has been associated with the Yoder Co. for the past five years.

—o—

L. F. Small has been named president, United Engineering Co., San Francisco.

—o—

Karl N. Carter has been appointed manager of general sales, Ohio Rubber Co., Willoughby, O.

—o—

Ralph Haddox has been appointed assistant manager of the tubular department, Oil Well Supply Co., Dallas, Tex., subsidiary of United States Steel Corp. He formerly had been president and general manager of the United Pipe & Supply Corp., Charleston, W. Va.

—o—

Fred A. Maser has been appointed superintendent of the Shippensburg, Pa., plant of SKF Industries Inc., Philadelphia. He has been associated with the company since 1927. The Shippensburg plant was recently acquired by SKF, and is expected to begin operations in July.

—o—

Robert C. Schenck has been elected president of the Duriron Co. Inc., Dayton, O. **William E. Hall,** former president, has been elected chairman of the board.

—o—

Wade B. Houk has been appointed division superintendent of the wire mill, South Works, Worcester, Mass., plant of the American Steel & Wire Co., Cleve-

A. H. SHONKWILER

FRED A. MASER

land. **Harvey R. Rice** has been promoted to a special assignment on the staff of the Worcester district manager. **Robert N. C. Hessel** have been named department superintendent of the cold roll, and **A. K. Zeitell** has been named department superintendent of the round wire department of that district.

—o—

Dr. Harry K. Ihrig, director of the laboratories of the Globe Steel Tubes Co., Milwaukee, was presented the Robert W. Hunt Award at the annual meeting of the American Institute of Mining & Metallurgical Engineers in recognition of his paper, "The Effect of Various Elements on the Hot-Workability of Steels."

—o—

Robert Hannan has been appointed a district representative for the Beardsley & Piper Co., Chicago. He will cover northern Illinois, Iowa, Wisconsin, Minnesota, and the upper peninsula of Michigan.

—o—

Ken O. Hood, Falk Corp., Milwaukee, has been appointed Pacific Coast district manager of the company. He will have headquarters in Los Angeles. Associated with the company for more than 10 years, Mr. Hood was recently manager of the Cincinnati district office. He is succeeded in that post by **Kenneth W. Morrissey.**

—o—

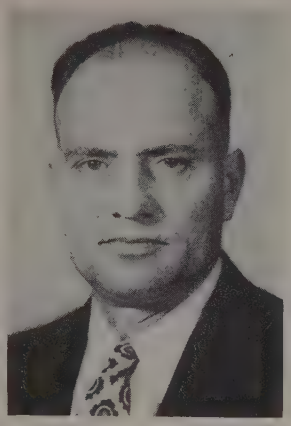
J. L. Stone has been named district manager, and **W. Reed,** assistant district manager, of the newly opened branch office in Dallas, Tex., for the Johnson Bronze Co., Newcastle, Pa. This office will cover the distribution of the company's products in four southwestern states.

—o—

William R. Carmichael has been appointed to head the distributorship which has been set up in Dallas, Tex., for the Gibson Mfg. Corp., Seattle, and Longmont, Colo.

—o—

J. C. McGunnigal has been appointed general sales manager for the Brainard



MELVIN SHAULIS

Named superintendent of the Brier Hill bloom and round mills, Youngstown Sheet & Tube Co., Youngstown. Noted in STEEL, Mar. 17 issue, p. 90.

Steel Division, Sharon Steel Corp., Warren, O. He was formerly manager of sales, Strip Steel Division. **Lester J. Lyons,** recently in charge of steel strapping sales in the Warren office, has returned to his former position as district sales manager of the New York sales territory, with offices in New York.

—o—

Additions to the executive staff have been announced by the American Coach & Body Co., Cleveland. **Robert W. Hadley** has been appointed president, and **Harold F. Smith,** treasurer. Mr. Hadley had been associated with the Toledo Machine & Tool Co., and, when that company was acquired by the E. W. Bliss Co., he was appointed chief executive officer in charge of the plant. Mr. Smith was also associated with Toledo Machine & Tool Co. He became a director of that company in 1931, and was also elected secretary-treasurer.

—o—

Paul R. Spencer has been appointed by Titan Metal Mfg. Co., Bellefonte, Pa., to be in charge of the Paul R. Spencer & Co., Denver, Colo., to represent them for all Titan brass and bronze products, including forgings, die castings, rods and welding rods. In addition to all of Colorado, Paul R. Spencer & Co. will represent Titan in Montana, Nebraska, Arizona, New Mexico and West Texas.

—o—

J. A. Gulick has been named a sales representative in charge of the Tulsa, Okla., offices of the Titan Metal Mfg. Co., Bellefonte, Pa., which offices have been moved from 310 Thompson Bldg. to 1348 South Indianapolis St., Tulsa 4.

—o—

D. N. Vedensky, Berkeley, Calif., has been retained as consulting research engineer by the M. A. Hanna Co., Cleveland. He will carry out a program of metallurgical research in connection with the beneficiation of iron ore.

—o—

Olney Brown has been appointed assistant general superintendent, Rustless Division, American Rolling Mill Co., Middletown, O. He became associated with the company in 1936 as a metallurgist, and since that time has been specializing in that field. In 1940 he was named superintendent of the production metallurgical department, responsible for the control of metallurgical practices in all plant production departments.

—o—

W. C. Wilkinson has been appointed purchasing agent, Cribben & Sexton Co., Chicago.

—o—

Dr. Leo I. Dana, manager of research for the Linde Air Products Co. and its associated units of Union Carbide & Carbon Corp., New York, has been awarded the Jacob F. Schoellkopf medal for 1947 by the Jury of Award of the Western New York Section of the American Chemical Society.

—o—

W. N. Noble has been appointed manager of the Frit Division, Ferro Enamel Corp., Cleveland. He succeeds **Louis B. Hart** who was recently appointed the company's West Coast manager with headquarters in Los Angeles.

OBITUARIES . . .

Fred T. Egan, 70, retired vice president of the J. A. Fay & Egan Co., Cincinnati, died Mar. 13. Mr. Egan was a son of **Thomas P. Egan,** founder of the company, and was active 25 years in the firm, until retirement in 1929.

—o—

Charles P. Jasper, 68, founder and president, Commercial Mfg. Co., Chicago, died Mar. 12 in that city.

—o—

William T. Conlon, 51, one of the engineers who helped develop the Navy's landing ship tanks, died Mar. 10 at his home in South Orange, N. J. He had been associated during the war with the Dravo Corp., Pittsburgh.

—o—

G. J. Sterling Thompson, regional director in Canada for United States Steel Export Co., subsidiary of United States Steel Corp., died Mar. 14. He became associated with U. S. Steel in 1911, and has been Canadian regional director since 1943.

—o—

Wilbur Eckels, 50, eastern representative and sales engineer, Cardwell-Westinghouse Co., Chicago, died Mar. 15 in Cleveland. He had been associated with the company for 20 years.

—o—

Abeel D. Osborne, 65, president of C. S. Osborne & Co., Harrison, N. J., died Mar. 11.

—o—

Floyd S. Thompson, 46, superintendent of the Lockport plant, New York State Electric & Gas Corp., Binghamton, N. Y., died recently. He had been associated with the corporation for 27 years.

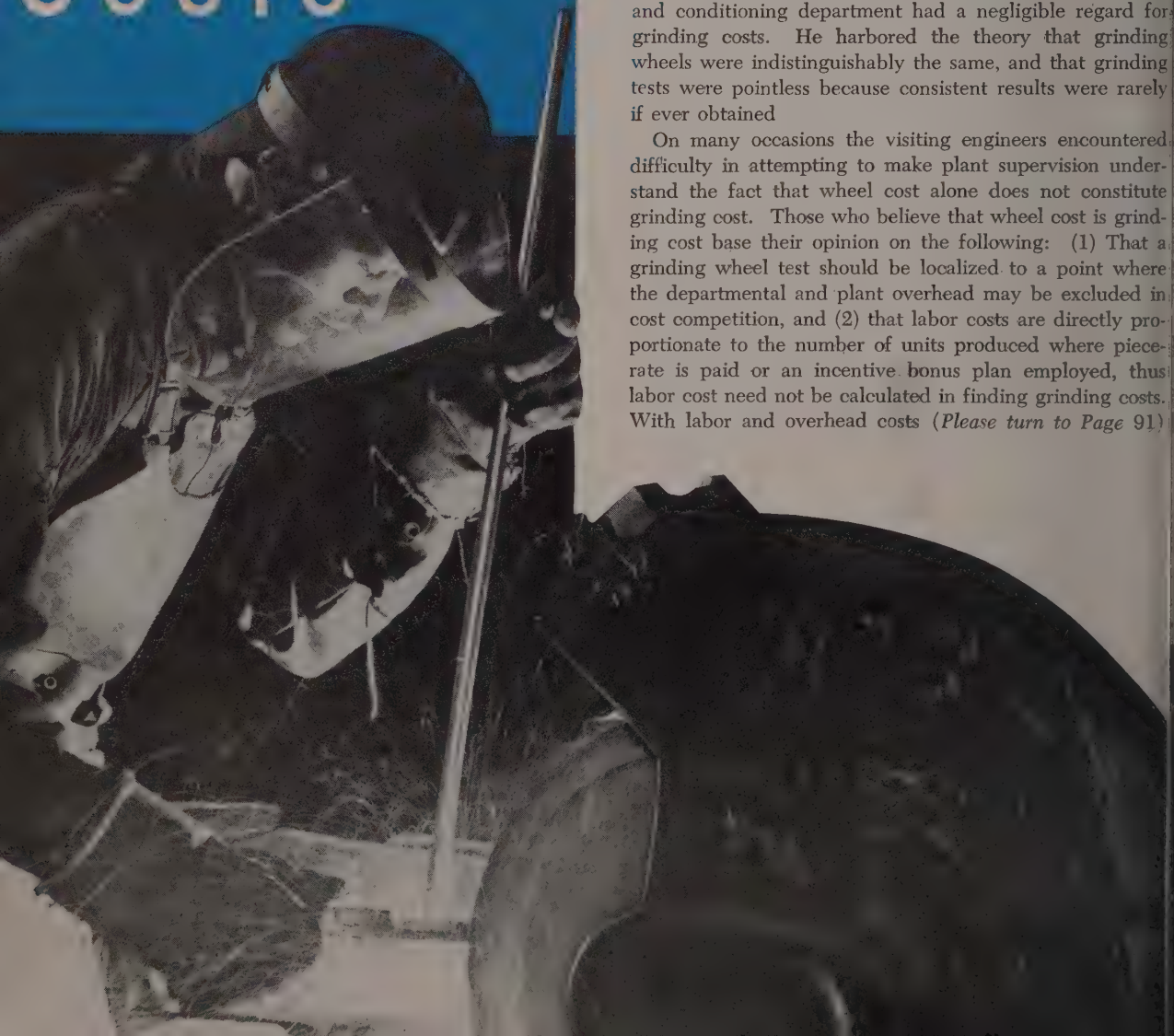
—o—

Arthur G. Green, 51, sales manager for the Bay State Abrasive Products Co., Westboro, Mass., died Mar. 6.

Close control over cost factors in swing frame and floor stand operations may be obtained by working out a simple equation:

$$\text{Total Grinding cost} = \frac{\text{wheel + labor + overhead costs}}{\text{pounds metal removed or tons metal ground}}$$

HOW TO ESTABLISH Grinding Costs



WITH the advent of the highly competitive postwar era, production costs are receiving increasing attention. In steel mills, foundries and factories, grinding costs are under close scrutiny; the more progressive companies are well aware that they must have an efficient system for determining actual grinding costs.

Incredible as it may seem, however, some plants are still employing dubious methods of computing grinding costs. Some are using outmoded methods applicable a decade or more ago but which no longer apply under present conditions; some have no method at all.

In coast to coast travels, abrasive engineers uncovered one system that used the figure of 65 cents per hour as the labor and overhead cost in calculating cost per ton of metal ground. This figure was established some 12 years ago and was less than one-fifth of that company's present actual labor and overhead cost.

In another instance the person in charge of a cleaning and conditioning department had a negligible regard for grinding costs. He harbored the theory that grinding wheels were indistinguishably the same, and that grinding tests were pointless because consistent results were rarely if ever obtained

On many occasions the visiting engineers encountered difficulty in attempting to make plant supervision understand the fact that wheel cost alone does not constitute grinding cost. Those who believe that wheel cost is grinding cost base their opinion on the following: (1) That a grinding wheel test should be localized to a point where the departmental and plant overhead may be excluded in cost competition, and (2) that labor costs are directly proportionate to the number of units produced where piece-rate is paid or an incentive bonus plan employed, thus labor cost need not be calculated in finding grinding costs. With labor and overhead costs (*Please turn to Page* 91)

TABLE I

Wheel A					Wheel B				
Casting Pattern Number	Contact Minutes	Casting Weight In	Casting Weight Out	Pounds Removed	Casting Pattern Number	Contact Minutes	Casting Weight In	Casting Weight Out	Pounds Removed
798	22.75	1234	1227	7	072	96.0	838	812	26
798	17.25	1246	1236	10	072	71.5	822	800	22
798	32.25	1236	1227	9	072	88.25	844	808	36
798	30.5	1222	1218	4	072	84.0	835	810	25
072	87.0	837	810	27	072	85.25	838	810	28
072	71.25	813	789	24	072	63.5	840	815	25
072	97.5	828	806	22	072	81.5	834	808	26
798	37.25	1242	1234	8	798	37.25	1243	1232	11
257	119.0	980	946	34	798	31.0	1234	1226	8
251	58.0	1420	1400	20	072	87.5	837	803	34
257	108.0	972	940	32	072	83.0	843	817	26
072	83	822	803	19	072	85.0	841	811	30
798	35.5	1225	1212	13	072	94.5	829	797	32
072	88.5	844	808	36	072	78.75	834	805	29
072	55.25	830	810	20	072	64.25	838	815	23
072	88.0	840	814	26	072	84.0	840	806	34
600	106.0	888	866	22	600	106	892	870	22
151	81.0	1084	1067	17	600	112.5	887	860	27
151	44.5	1064	1050	14	072	79.5	846	815	31
798	18.0	1234	1227	7	072	84.5	838	804	34
798	46.75	1200	1188	12	072	68.25	834	809	25
798	43.0	1243	1232	11	072	82.0	841	808	33
072	68.75	823	800	23	072	87.5	833	797	36
072	83	840	813	27	072	85.0	840	802	38
072	76.25	818	796	22	072	90.5	827	804	23
257	122.0	957	932	25					
072	118.0	832	808	24					
967	49.5	658	650	8					
967	112	828	797	31					
798	51	1252	1239	13					
072	122	846	816	30					
TAL	34.97 Hrs. 15.579 Tons			597	33.51 Hrs. 10.914 Tons				684

TABLE II

Wheel	Hours Contact Time	Tons Metal Ground	Wheel Cost	Wheel Cost Per Ton Ground	Total Labor & Overhead Cost	Labor & Overhead Cost Per Ton Ground	Total Cost Per Ton Ground
A	34.97	15.58	43.86	2.82	183.59	11.78	14.60
B	33.51	10.91	43.86	4.02	175.93	16.13	20.15

Wheel	Hours Contact Time	Pounds Metal Removed	Pounds Metal Removed Per Hour	Wheel Cost	Wheel Cost Per Lb. Metal Rmvd.	Total L & O Cost	L & O Cost Per Lb. Metal Removed	Total Cost Per Lb. Metal Removed
A	34.97	597	17.07	43 86	.0735	183.59	.3075	.3810
B	33.51	684	20.41	43.86	.0641	175.93	.2572	.3213

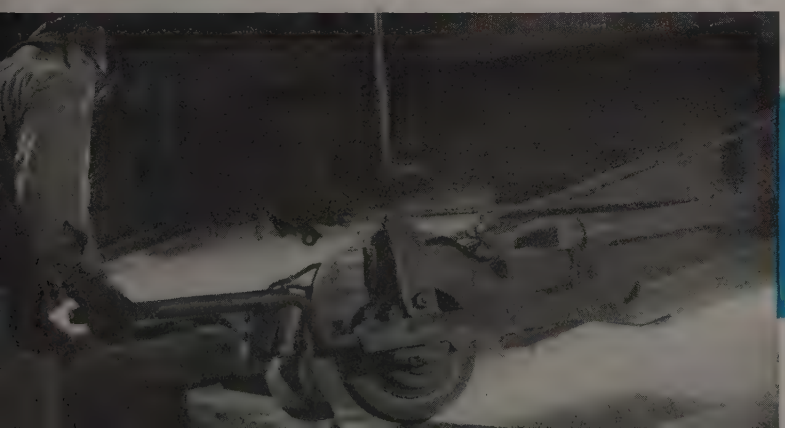
TABLE III

	Life	Tons Ground	Total L&O Cost	L&O Cost Per Ton Ground
Wheel A	16	4.5	$51.20	$11.38
Wheel B	14	4.3	44.80	10.42

(Labor and overhead rate = $3.20 per hour)

TABLE IV

Wheel	Hours Contact Time	Pounds Metal Removed	Pounds Abrasive Used	Cost Per Lb. Abrasive	Cost of Abrasive Used	Wheel Cost Per Lb. Metal Removed	L & O Cost At $4.00/Hr	L & O Cost Per Lb. Metal Rmvd.	Total Cost Per Lb. Metal Removed
A	20.82	178.2	62.78	.4477	28.11	.1577	83.28	.4673	.6250
B	22.97	160.1	60.98	.4613	28.13	.1757	91.88	.5739	.7496
C	23.78	196	60.08	.4679	28.11	.1434	95.12	.4853	.6287
D	25.99	199.67	63.90	.4399	28.11	.1408	103.96	.5207	.6615
E	32.25	229.2	59.4	.4732	28.10	.1226	129.00	.5628	.6848
							L&O Cost At $2.00/Hr		
A	.....	.....	.....	.....		.1577	41.64	.2337	.3914
B	.....	.....	.....	.....	.....	.1757	45.94	.2869	.4626
C	.....	.....	.....	.....	.....	.1434	47.56	.2427	.3861
D	.....	.....	.....	.....	.....	.1408	51.98	.2603	.4011
E	.....	.....	.....	.....	.....	.1226	64.50	.2814	.4040
A	.....	.....	.....	.....	.....	.1577	.....	.....	.....
B	.....	.....	.....	.....	.....	.1757	.....	.....	.....
C	.....	.....	.....	.....	.....	.1434	.....	.....	.....
D	.....	.....	.....	.....	.....	.1408	.....	.....	.....
E	.....	.....	.....	.....	.....	.1226	.....	.....	.....



By A. S. WYBORSKI
Abrasive Engineer
Peninsular Grinding Wheel Co.
Detroit

Fig. 1 — Grit-blasting both edges of plate to insure clean surfaces for welding

Fig. 2 — Planing edges of plate to true size and proper bevel

Fig. 3 — Plate being rolled into cylinder on pyramid roll

Fig. 4—Welding longitudinal seams by submerged-arc process

Fig. 5 — Welding circumferential seams by the submerged-arc process

Fig. 6 —Pipe sections are stretched and tested in this hydraulic expander

Fig. 7 — Brush-cleaning inside of pipe

inch Pipeline

. . . fabricated by Consolidated Steel Corp. from 60,000 tons of 92-in. manganese steel plates. Latest continuous methods used

FABRICATION of 30-in. manganese steel pipe for a 214-mile high-pressure gas line between Los Angeles and Blythe on the California-Arizona border is "50 miles underway" at the new Los Angeles plant of Consolidated Steel Corp. Using the latest manufacturing techniques, the plant is equipped for vacuum-blasting, submerged arc welding, hydraulic expansion, all on a fast-moving production line basis. Scheduled rate of production involving about 60,000 tons of steel for the entire 214 miles is 9 miles per week.

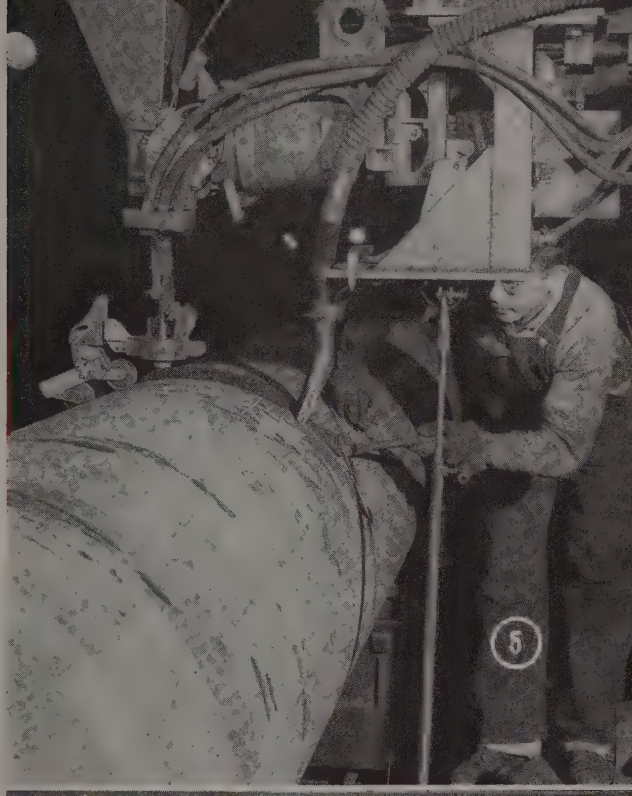
The pipe itself is so-called "high test" with a minimum yield strength of 52,000 psi. It is made of alloy steel plates 92 in. wide and 30 ft long, with a manganese content of 0.90 to 1.25 per cent.

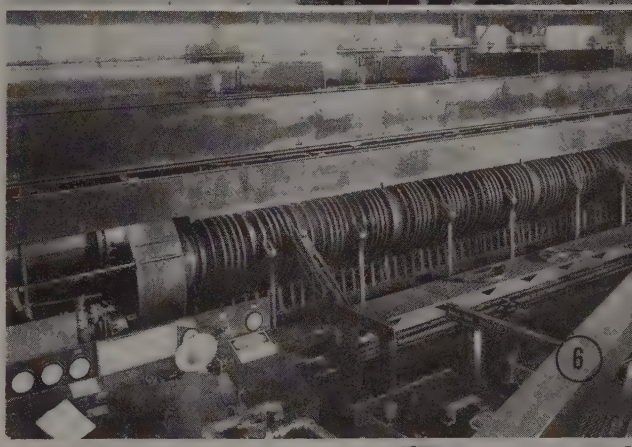
On the production line plates are conveyed through leveling rolls to remove waves and buckles; then to a shear, which trims the ends; past grit blasters, Fig. 1, to remove mill scale from the welding edges to an in-distance of about 2 in.

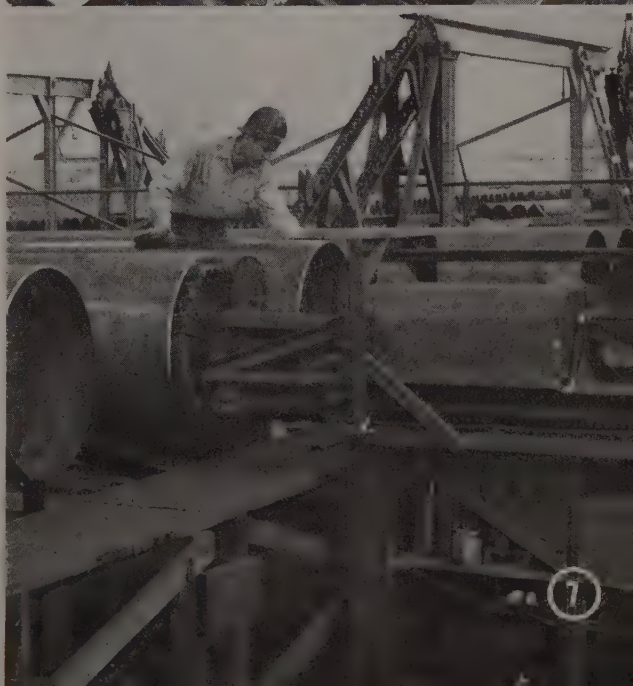
The grit blasters or Vacu-Blasters manufactured by Vacu-Blast Corp., San Francisco, consist of a specially designed blasting gun, abrasive reclaimer, dust collector, abrasive storage tank and vacuum pump unit. The gun has a blasting nozzle enclosed by a cone surrounded by a vacuum pickup cone and further enclosed to the point of surface contact by a brush in a flexible retainer. In operation, brush is held in contact with the surface; air stream from the vacuum return line picks up dirt, dust and abrasives. The permanent installation on the Consolidated production line uses one Vacu-Blaster for each side of the plate.

Next, planers as shown in Fig. 2, reduce the plate to precision width and squareness. Plates then go to the edge rolls which bend edges to initial radius; thence to the bending rolls, Fig. 3, for cylindrical shaping. Leaving the latter roll, the cylinders are fed end to end through seam welders and welded edgewise by the submerged arc process, Fig. 4.

Cylinders are first made slightly smaller than the specified 30 in. In a subsequent operation the ends are mechanically expanded and then the entire cylinder is placed in a hydraulic expander, Fig. 6. Here the pipe section is water-filled and a pressure (*Please turn to Page* 110)







Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

TOOL ENGINEERS IN TEXAS: When this issue of STEEL goes to press, I will be—if not exactly "deep in the heart of Texas"—at least in the up-and-coming city of Houston. This idea of having the annual meeting of the American Society of Tool Engineers in Houston is a happy one.

In the first place, it is a well-deserved tribute to the many and very able tool engineers from Texas who, twice each year for a number of years, have attended the annual and semiannual meetings of ASTE in distant places where the weather—especially in March——has had little to recommend it to any native of the Lone Star State.

I have always noticed that those who live far from the headquarters of any technical society are apt to be among its most faithful and progressive members. They don't "lean on the headquarters staff"—they create worthwhile activities of their own which add much to the prestige of the organization as a whole.

Another excellent reason for holding this national convention in Texas is that big and original and highly important things in tool engineering are now being carried on in Houston and in many other places in that land of tremendous area, tremendous natural resources and tremendous urge to convert those resources into finished products in Texas for the benefit of the people of Texas. That kind of spirit makes better jobs for more people than does mere exploitation of natural resources for conversion and processing in some other part of the country.

Those of us who live in the older industrial centers tend to get a bit set in our ways—doing familiar jobs in familiar ways, which in these changing times may not be the best ways. Within the past few years the industrial growth of Texas has posed all sorts of new problems ranging all the way from tools which operate in the bowels of the earth, cutting the hardest varieties of rock, to aircraft which operate in the rare atmosphere miles above the surface of the earth.

The tool engineering which enters into everything which goes down into an oil well is at least on a par—and in some cases it may be even better—than that which enters into the building of aircraft. Several years ago, I went to Pittsburgh, Pa., with a group interested in selling theading tools to a company making deep casings. On the way down, some of these men talked as though it was going to be something of a come down to them to "quote on tools for threading pipe"—the inflection on that word "pipe" indicating that they were thinking in terms of sewer pipe.

I never have seen any more surprised men than some of these were when they encountered the array of gages and other scientific checking equipment—and the specifications and limits involved—in this "pipe threading job". It turned out to be a tool engineering assignment of "Tiffany" caliber to get those threads so that they would pass muster. No oil man wants to dangle two miles of badly tool engineered tubing down a well any more than he wants to fly two miles high in a badly tool engineered airplane. Things like that are what keep Texas tool engineers on their toes.

In the 30 years or more that I have been getting around among the industrial centers of the United States, I have always noticed that in the newer centers many new things "that couldn't be done," are being done. Not realizing that it couldn't be done, they simply went ahead and tried some unheard-of method that achieved the impossible. We will get plenty of fresh air and fresh viewpoints in Texas.

BENEVOLENT VIBRATION: When designing and experimenting with new models of machine tools, one of the things which usually is done is to avoid or eliminate vibration. Sometimes it requires the detective ability of a Sherlock Holmes to track it to its source, and the ruthless determination of a political "ax man" to remove it from the machine.

During a recent interesting visit to Landis Tool Co., experimental engineers of that company showed me a case where procedure regarding vibration has been reversed. They have introduced vibration into a mechanism.

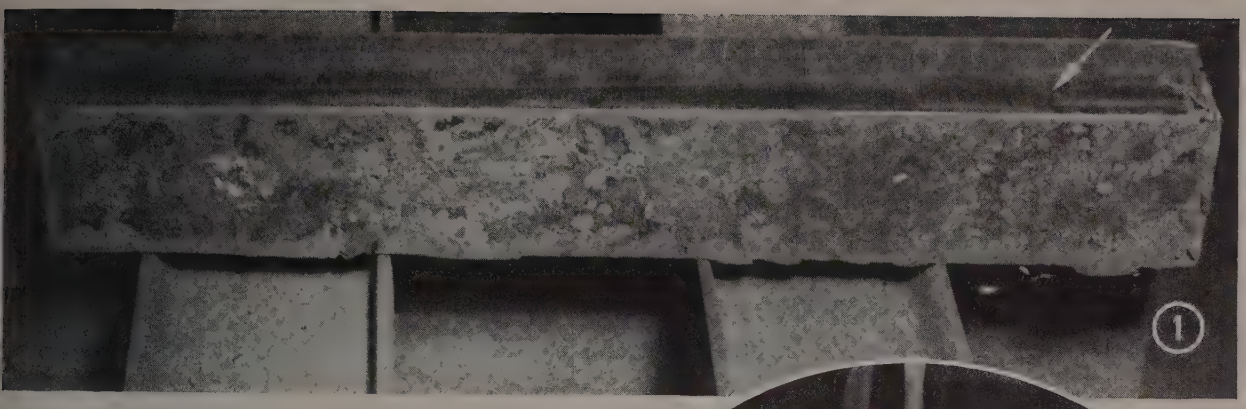
Watching a Landis centerless thread grinder in operation, I noticed a circular reservoir of set screw blanks. These blanks were busily arranging themselves around the periphery of this reservoir, and—like a column of trained caterpillars—they were climbing up a spiral ramp around the inside of the reservoir and were "crawling" one by one into a tube which conducted them one after the other between the crushed-dressed grinding wheel and the gaging wheel.

There are no moving parts—as we generally think of moving parts—in this unique magazine feed. However, the entire reservoir is mounted on a high-frequency electromagnetic vibrator, insulated, of course, from the main frame of the machine. The vibrations are so oriented that they urge the blanks onward, and upward by rapid and minute steps, causing steady flow around and upward and into the feed tube connected to the top of the spiral track.

This clever and successful "magazining" technique brought to mind the chip feed trough which my friend A. B. Einig demonstrated to me some time ago in connection with a big Motch & Merryweather circular saw, cutting magnesium billets. To avoid fire hazard, the magnesium chips were caught in a trough immediately below the cutting point and were run into a metal barrel.

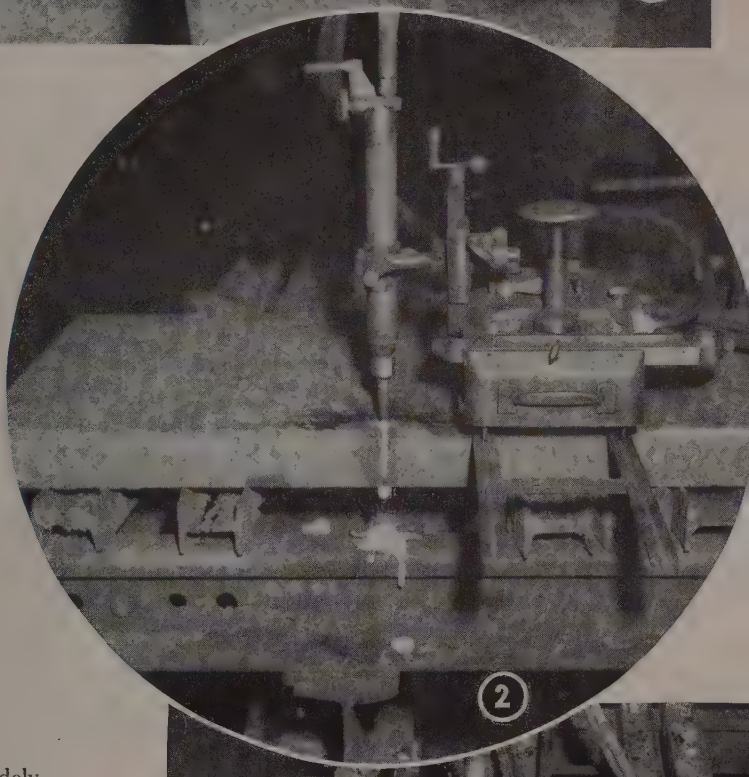
The queer thing about it was that they acted like Powder River ("A mile wide and an inch deep—and it runs uphill!"). These magnesium chips did run up hill, just as they would in a movie if film were run backwards.

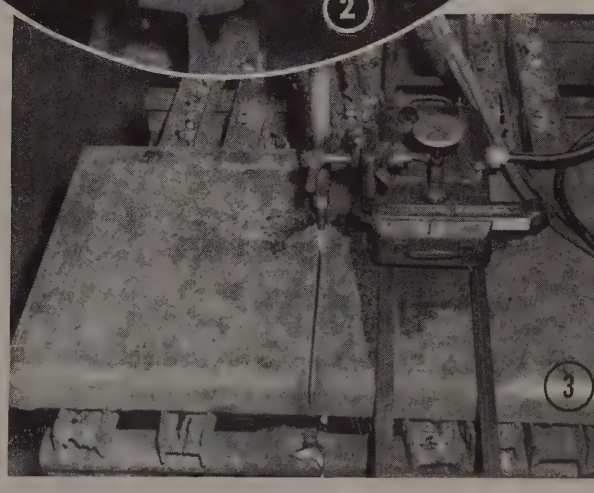
Vibration did it. The trough was mounted on electromagnetic vibrators which tossed the chips onward and upward by rapid, minute steps adding up to rapid flow.



CITY GAS and OXYGEN

..mixture effective n flame cutting steel





A MIXTURE of city gas and oxygen is being widely sed by a large steel warehouse in Cambridge, Mass., for utting steel to customers' specifications. With the co-peration of the Cambridge Gas & Light Co., and using ty gas at a street main pressure of 5 oz, this method has roved economical for cutting shapes to order.

Steel plates from thinner gages up to 12 in. in thick-ess are cut to pattern in varying quantities. The clean, quare edges resulting are said to be relatively free from erf marks and oxidized material, thus requiring little or o machining. Because of the close tolerances possible ith proper conditions—an experienced operator, a suit-ble burner tip, the right mixture of gas and oxygen, and orrect machine speed for a given plate thickness—the abricator has been able to build a substantial business on is operation.

Accompanying illustrations show (Fig. 2) the start of cut in 2¼ in. thick 15-20 steel with a 530 Btu manufac-ured gas-oxygen mixture and No. 2 Harris-Calorific urner tip. The motor-driven torch holder is set for a utting speed of 6 ipm. Fig. 3 shows the cut over half-ay across the slab after 2 min. In Fig. 1 is shown (in-icated by arrow) the cut face of a slab severed by this ethod.

Flame cutting thinner material with the city gas-oxygen mixture is reported to be equally successful. For example, circular shapes of ¼-in. 15-20 steel plate can be cut with a No. 1 Harris burner tip at a speed of 16 ipm, with cutting torch mounted on a variable speed dolly on a trammel.

HOW TO SELECT

Coatings for

Best finish and method of application is one most suited to shape, size and ultimate use of the manufactured article. Suggestions offered here apply to cast, extruded, sheet as well as foil aluminum products

ALUMINUM as a versitile metal, requires versatile finishes. It is finding increased use in every phase of industry. Like heavier metals, however, aluminum may need one or more of the following types of finishes for many applications: A resistant finish to protect it from acids, alkalies or other corrosive chemicals; a protective finish to prevent discoloration by the atmosphere; a decorative finish to enhance the beauty of the article that is formed.

Since many objects of aluminum require an organic protective coating combining one or more of the above properties, the best finishing system and method of application is the one most suited to the shape, size and ultimate use of the manufactured article. Therefore, purpose of this article is to aid the fabricator or finisher.

But first, a word of caution to the finisher: The best quality paint is not necessarily the best paint for aluminum. There are some properties peculiar to this light metal which make even first grade coatings for steel entirely unsuited to use on aluminum. Certain metallic pigments that show outstanding corrosion-inhibitive properties on steel are ruinous to aluminum. Another type of coating to be avoided is the "water paint," for the alkaline emulsifying agents used in such finishes readily attack aluminum.

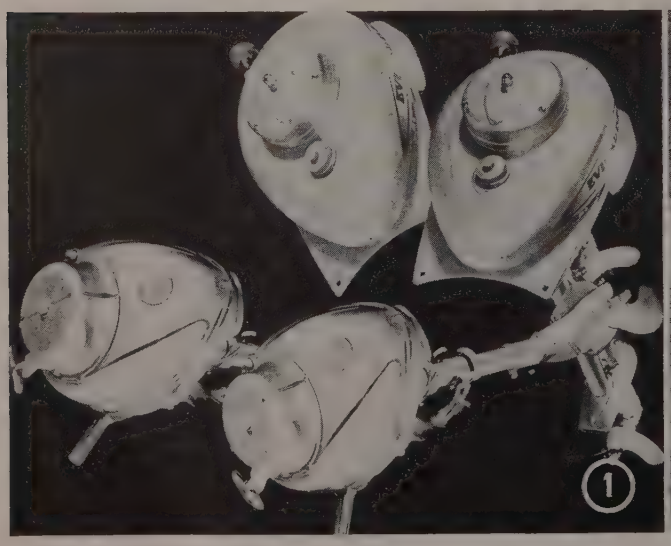
It is of utmost importance, therefore, that finishes for aluminum be prescription compounded specifically for use on that metal.

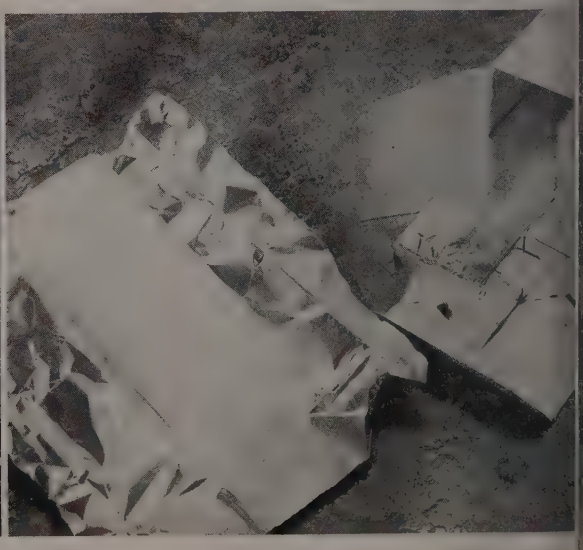
Basically, aluminum metal is furnished in the form of castings, extrusions and forgings, sheet aluminum and foil. Here, these are treated under two general headings —cast aluminum and wrought aluminum.

Essentially, aluminum castings are manufactured by one of three methods: Die casting which is dimensionally accurate and affords a dense smooth metal surface; permanent mold casting which combines maximum speed with accuracy of dimension; and sand casting which is most economical in forming small quantities of any specific shape, but gives a rougher porous surface.

The finisher's problem in coating cast aluminum is to obtain that coating which will serve a threefold purpose—to cover the porous surface completely, to be attractive, and to be serviceable under specified conditions. To attain that finish, he must pretreat the metal either by sand blasting, one of the best methods for use on rough castings; by phosphate treatments—Parker Rust Proof Co.'s Bonderite or American Chemical Paint Co.'s Durodine and Alodine treatments are typical of this method; by using solvent-phosphoric acid treatment; by chemical oxide coating, of which the Aluminum Co. of America's Alrok is typical. (This method of pretreatment is especially suitable where good exterior durability is necessary); or by electrochemical oxide coating, such as Aluminum Co.'s Alumilite process. (This is frequently used when the rough surface of castings has first been machined to a smooth finish).

Regardless of which method is used, it is wise to prebake the casting at approximately 250° F, prior to finishing. This removes all water (*Please turn to Page* 97)





Aluminum

Reported by
RAY SWAN & N. P. RUTHER
for the
Research Staff
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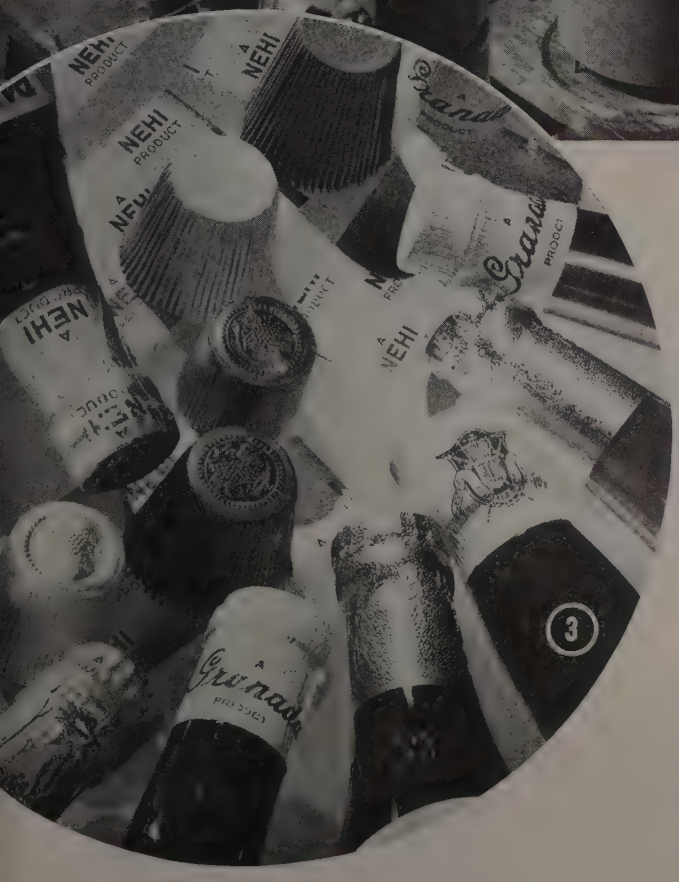


Fig. 1—Among typical examples of the use of thin sections of aluminum are these outboard motor housings

Fig. 2—Foil coatings, such as those shown here for foods, must include properties that make them sanitary and nontoxic

Fig. 3—As used here, foil coatings for bottle wraps must also help "sell" the product. For decorative uses, they are made to take transparent colors

Fig. 4—Aluminum castings for motors undergoing a special finishing operation on the production line. All photos courtesy of Aluminum Co. of America

The Case for AXONOMETRIC

Simplicity of one-view engineering drawings compared to conventional multiplanar, or three-view presentations reduces difficulties of getting the idea and the picture across to the man at the bench

TEXTBOOKS on engineering drawing describe a number of different methods of picturing objects. Best known of these methods are the multiplaner or three-view presentation, commonly called blue print method, and the axonometric or one-view drawing, subdivided into isometric, dimetric and trimetric systems. Both methods belong to one class of illustration, the orthographic projection, because the projectors connecting every point of the object with the corresponding point of the picture are perpendicular to the plane of the picture.

In the multiplaner or three-view drawing, three different views are required to show the three principal faces of a given object, usually called top, front and end views because in every one of these the face shown is parallel with the plane of the drawing so that the other two faces are entirely suppressed. In the second method (axonometric or one-view), the object is turned and tilted in such a way that the projected picture shows all three principal faces in one view, though each in a more or less perspectively distorted shape and dimension.

In a three-view drawing, the angles occurring between edges or lines in every face of the object are represented in the corresponding view by identical angles, while in one-view drawings (axonometric) the angles of the object are represented by quasi-perspectively distorted angles. Since right angles are the most typical components of technical objects, it will help to understand the difference between the two systems if we state that in three-view drawings the right angles of the object are represented as right angles, while in axonometric (one-view) drawings right angles appear as 120 and 60 degrees in the case of isometric projections, and as odd angles in the case of

DESIGN OF Welded Steel Motors

. . . enables use of novel manufacturing techniques

USE of welding in the manufacture of electric motors and generators is not new, although designing and manufacturing engineers are continually finding new ways of applying this very useful process. Moderate-sized welded steel squirrel-cage motors recently developed by Elliott Co., Jeannette, Pa., illustrates one such application along with some novel manufacturing techniques. The sizes included are from 150 hp to 1000 hp 4 poles, with corresponding ratings for other numbers of poles.

According to Quentin Graham, manager of the company's Ridgway, Pa., division, some of the problems presented to the designer in developing motors in these

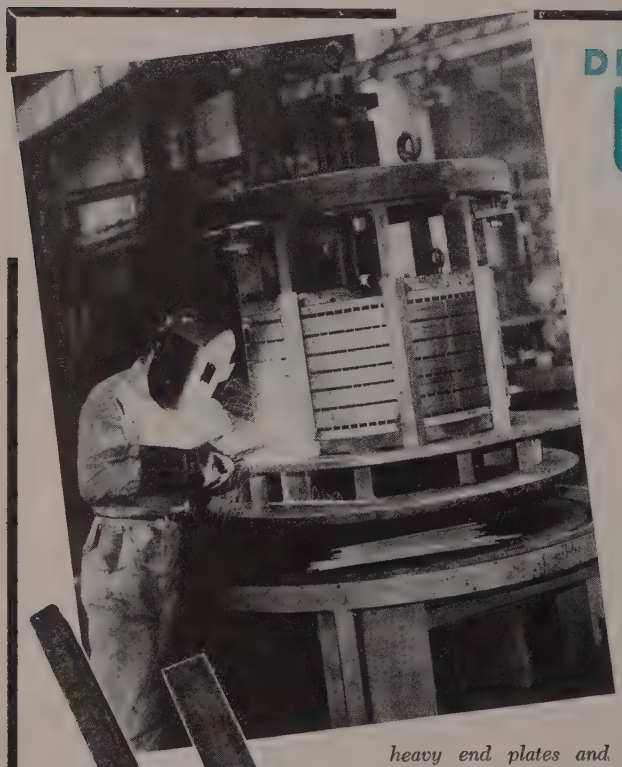
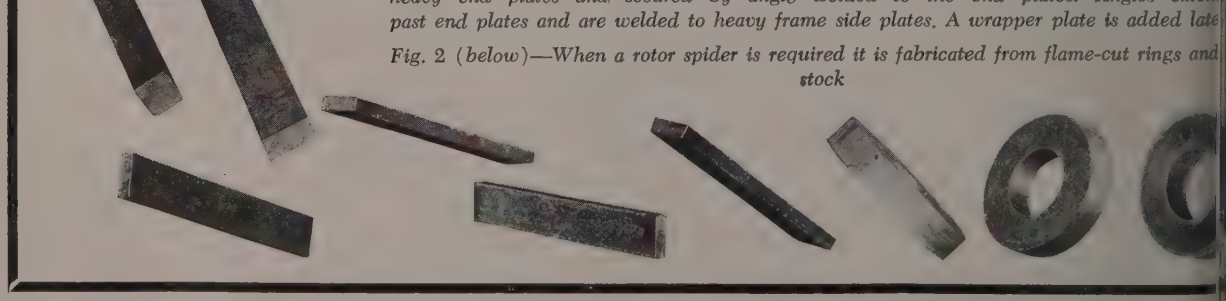


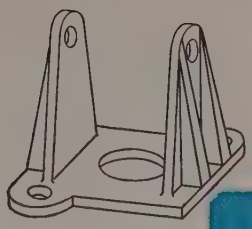
Fig. 1 (above)—Stator for squirrel cage motor under construction. Punchings are built on a mandrel, pressed between heavy end plates and secured by angle welded to the end plates. Angles extend past end plates and are welded to heavy frame side plates. A wrapper plate is added late

Fig. 2 (below)—When a rotor spider is required it is fabricated from flame-cut rings and stock



DRAWING

By PAUL F. BOEHM
President
Instrumaster Industries Inc.
Greenwich, Conn.



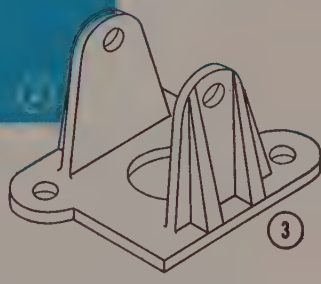


Fig. 1—Dimetric drawing of object in Figs. 2 and 3
Fig. 2—Conventional "three-view" drawing of machine part
Fig. 3 — Isometric drawing of same object as shown in Fig. 2

netric and trimetric drawings.

What applies to right angles applies in a similar way the second most common element of technical objects, e circle and circular arc. In the three-view system, cles or circular arcs existing in any principal face of e object are represented by circles and circular arcs the picture. In axonometric drawings, however, they e represented by ellipses or elliptic arcs, the shape of ich depends upon whether an isometric, dimetric, or metric projection is being used, and, in the latter two ses, even upon which one of the faces contains that cle or arc.

The preceding summary of essentials will explain sufiently how the two systems of drawing differ so fundnentally. In fact, the differences as pointed out mean at the one-view drawing is so (*Please turn to Page* 103)

zes are: 1. Standard enclosures such as drip-proof, lash-proof, forced-ventilated, etc. must be available; both split-type sleeve bearings and ball or roller beargs are required; 3. a variety of core widths for each ameter as well as special mounting dimensions must e readily obtainable without excessive tool and fixre cost; 4. appearance is important, with clean lines nd modern styling desirable.

A unique feature is the bearing bracket or end ield design, which makes use of a solid flanged head the basic shape with the bearing assembly as a parate insert. From the user's point of view this arngement makes inspection and replacement of sleeve earings relatively easy. Instead of having to unbolt nd lift off a heavy half-bracket, the maintenance man mply removes a light bearing cap.

From the manufacturer's standpoint there are a numer of advantages. First, with the bearing housing parated from the supporting bracket, machining bemes much simpler than for conventional split brackets. he housing itself, which is the more intricate part of e structure, is handled on a turret-lathe, a small millg machine and a drill press.

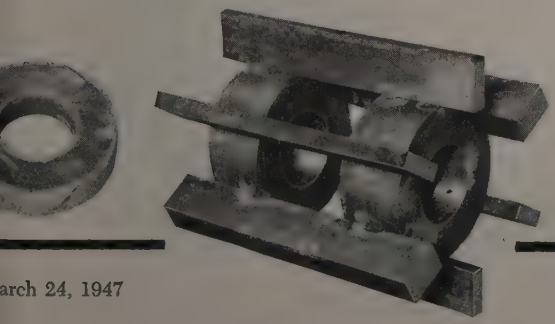
The large diameter piece, the bracket proper, requires the use of a vertical boring mill, but there are nly two simple boring and facing operations plus some drilling and tapping in one plane. The elimination of the operations of milling the parting surfaces, turning the bearing seats and drilling and tapping holes at various angles in a large heavy structure is a decided manufacturing advantage.

The bracket proper starts as a flanged head, one of the present day available shapes, to which an edge-rolled ring is welded to form a bolting flange. Openings as required for ventilation and for insertion of the bearing housing are flame-cut in the head and an additional bearing support is welded in place. The resulting structure is rigid but light in weight.

The stator member contains some novel features. There is no frame in the usual sense, but instead a supporting structure is built around the punchings. A building mandrel is first set up and the punchings are stacked over slot keys and pressed between end plates by hydraulic pressure. The cross members, consisting of steel angles, are then welded to the end plates to lock the core in place. At two or more points the weld is carried across the back of the punchings to act as a key against circumferential movement.

The frame plates are then welded to the ends of the angles in such a position as to give proper ventilating space around the core. Feet are positioned in the building fixture, welded in place and a heavy wrapper plate is then applied. It was found that modern flame cutting technique was sufficiently accurate to cut the core end-plates and frame plates from rolled plate stock without the need for any machining before assembly. The end plates are taken from the centers of the frame plates, thus reducing scrap losses.

After the stator is completed, stacked and welded it is stripped from the building (*Please turn to Page* 112)



Engineering News at a Glance

STEP-SAVING PROCESS: New process originated by Hungerford Plastics Corp. engineers for compounding thermoplastic materials is applicable to practically all materials requiring the addition of a liquid plasticizer. It eliminates use of solvents and slurries, as well as the usual steps of combining materials into a fused mass, mechanical working, hardening and grinding. The New Jersey company reports that with the process, the flake or resin, dye, pigment, stabilizer, extender and filler are charged into a compounding chamber which is rotatably mounted. During rotation, plasticizer and other liquid additives are spray-injected into the chamber, after which the material is dehydrated by filtering hot dry air through it as the chamber continues to rotate. Material, which remains in powder form throughout the process, is then ready for feeding into ordinary molding and extruding equipment.

MORE BETATRON RESEARCH: In Washington, it was learned, plans were recently completed at the National Bureau of Standards for erecting two betatrons to enable scientists to extend research, measurements and standards development into the 50 and 100 million volt range. Main chamber in which the 50-million-volt betatron is to be housed, and x-rays produced, will be completely buried underground and covered by several feet of concrete and earth. The sensitive measuring equipment is to be concentrated in an adjoining smaller room. Facilities also are designed for determining the protective values of concrete and many other materials, under conditions that will permit of their broad interpretation in both the medical and industrial x-ray fields.

NIGHT-FLYING LIGHTING: Brilliant illumination for airports in communities of less than 25,000 population as well as for flying clubs and schools is provided by a portable lighting system designed by Westinghouse Electric Corp., Pittsburgh. Capable of being operated by one man, it includes a beacon, floodlights, landing strip markers and a wind cone. Key unit in the system is a mobile floodlighting trailer mounted on two wheels. This is equipped with an electric generator that supplies the power for the whole system and for two to four floodlights. Placed at one end of the landing strip, the floodlights are directed down the runway to shine on the markers stuck in the ground at 100-ft intervals. The latter clearly outline the landing path to the pilot.

INCREASED BELT LIFE: Accelerated laboratory tests conducted at B. F. Goodrich Co., Akron, indicate life of recently developed light duty and automotive V-belts are increased at least 50 per cent through use of rayon cord in tension members. Permanent stretch of the belts, now in production, is much less than the old due to characteristics of the rayon cord itself and to increased adhesion between cords and rubber, the company reports. High elongation of the cords during a change in tension, plus the high rate of recovery make them particularly suitable for drives requiring frequent adjustment.

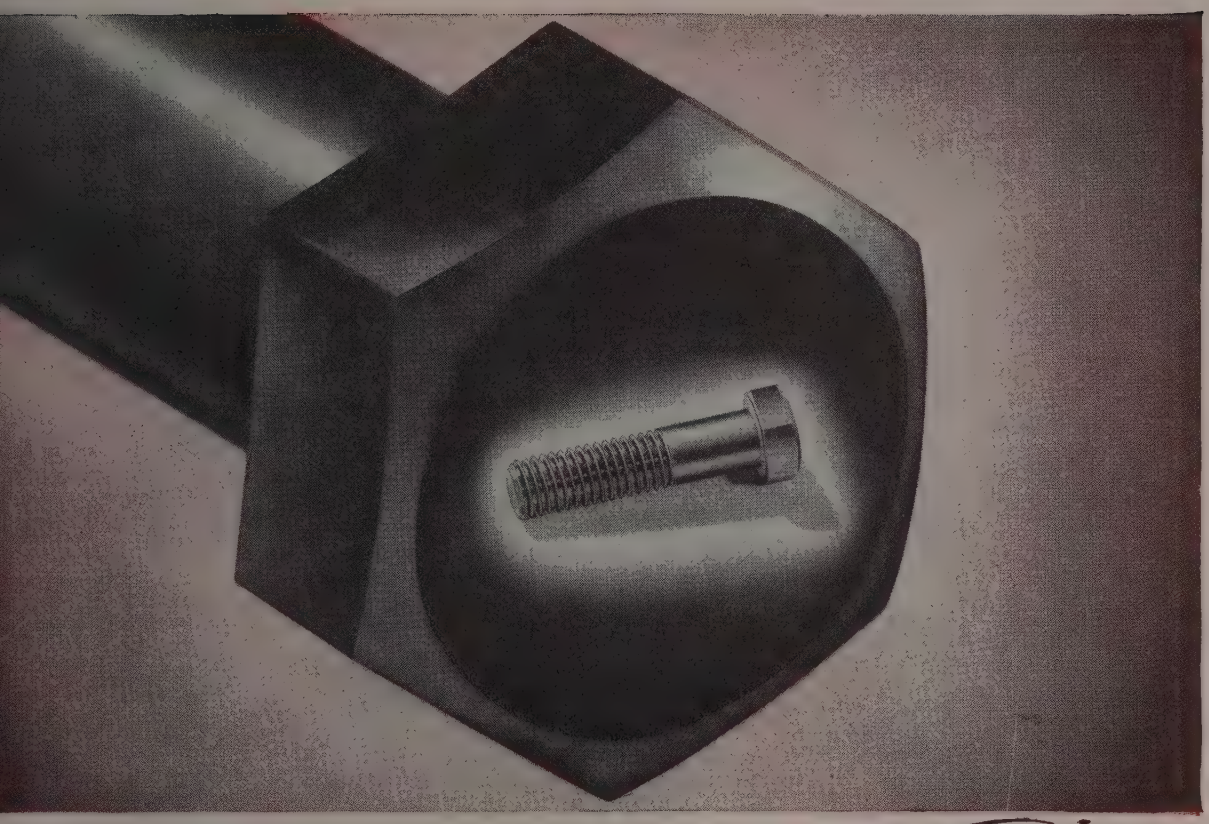
LASTING CONNECTION: From the West coast, Martin Wells reports that the addition of a small copper disk to its electrode holder now makes it possible to silver braze cable so that the connections will outlast the life of the cable. The process is said to be almost as simple as soft soldering, resulting connections providing greater amperages and cooler operation.

FILTERS OF STAINLESS POWDER: Prealloyed stainless steel powder under rigidly controlled specifications is used by Micro Metallic Co., Forest Hills, N. Y., for making its stainless steel filters. Charles Hardy Inc. reports the company achieves uniform porosity through uniformity in the powder grain. A strong, coherent structure is gained by sintering in a wide variety of molds. Certain types are supplied with tensile strength as high as 30,000 psi, with minimum rating of 5000 psi for the coarsest grade. The filters are made with average pore openings ranging from 0.0065 down to 0.00015-in. Finest size is comparable to the most retentive grade of filter cloth and paper, whereas the coarsest is comparable to approximately an 80 mesh screen.

MAY PIERCE TRANSONIC "BLOCK": Research indicates that supersonic aircraft using supersonic airfoil sections are likely to experience less difficulty in passing through transonic speeds than had been previously expected. According to a paper delivered by John Stack, National Advisory Committee for Aeronautics, at the sixth International Congress for Applied Mechanics held at the Sorbonne, Paris, sharp-edged, supersonic profiles may also find application to improve the efficiency of high-speed propeller blades near the tips where ordinary profiles drop off in efficiency at tip speeds approaching the speed of sound. This, he pointed out, is due to the peculiar character of airflow about the sharp leading edge of supersonic airfoils. The change from separated to smooth attached flow means not only reduced drag, but also more favorable conditions for control surfaces.

PROVIDES ALL DIMENSIONS: With the coming of jet propulsion, numerous new problems developed bringing many new devices and techniques to industry. A fast and accurate method of inspecting blade and bucket profiles, for example, was one of the major problems of importance. To meet this, Engineers Specialties Division, Buffalo, created a surprisingly easy, yet revolutionary method of optical projection referred to as the Pant-O-Jector system. It makes possible extremely practical and precise measurement and comparison of turbine and compressor blades at any and all desired locations. Likewise it enables an operator to project for precise measurement large and irregular contours and internal cavities. One of the main features of the unit is that it can be used on standard comparators with a 14-in. diameter or larger screen.

LESS WEIGHT — MORE FREIGHT: Investigations being conducted by railroad, industrial and metallurgical engineers seek to reduce dead weight of freight cars while retaining or even increasing strength and carrying capacity. Railroaders estimate that a reduction of 1 ton deadweight haulage, with no change in life, cost or maintenance would save $12 per car in a year's operations. Thanks to the rapid progress in development of high strength alloy steels, this aim is already being realized, for when steel can be used at higher working stresses, less of it is required. "The Vancoram Review," published by Vanadium Corp. of America, points out that among the many developments in freight car manufacture the progressive improvement of axles is representative. Steelmaking, forging, heat treating and machinery processes are refined to such an extent that axles today are far superior to those of a decade ago. Interesting example is a recently perfected hollow axle that is reported to save ½-ton of deadweight for each railroad car.



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aw material that is subjected to the most rigid mechanical and hysical examination . . . cold-forming on the most modern ma- hinery . . . continuous inspection at every stage of manufacture . . contribute to your assurance that RB & W Cap Screws will ave uniformly high physical properties and a finish that enhances he appearance of the finished product.

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3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control
4. Reduce the number and size of fasteners by proper design
5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

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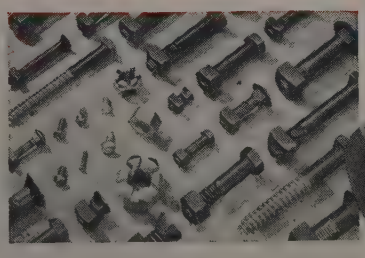
02 years making strong the things that make America strong



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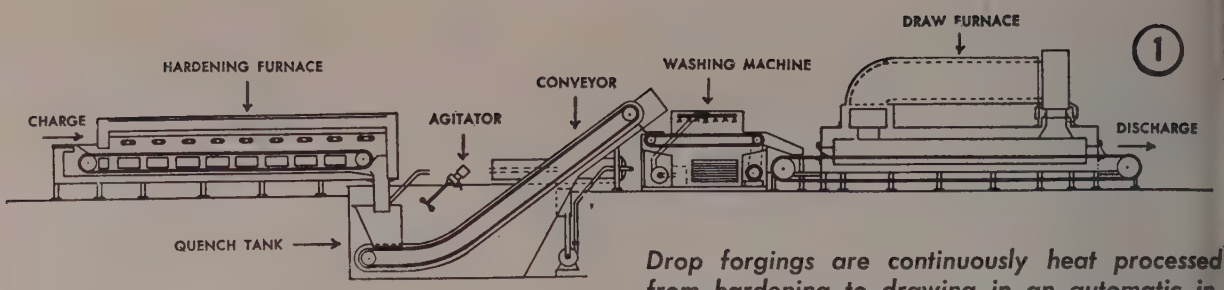
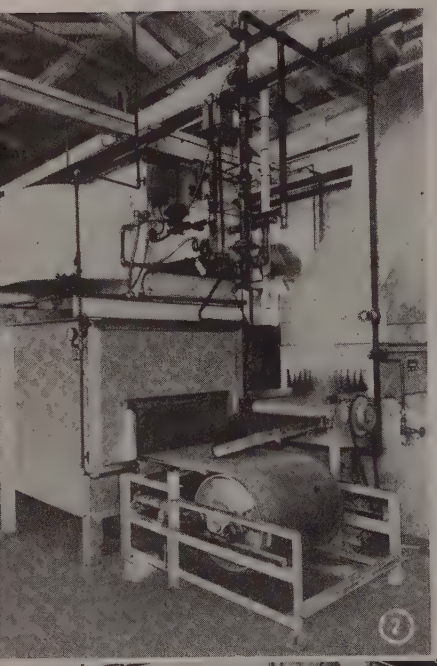
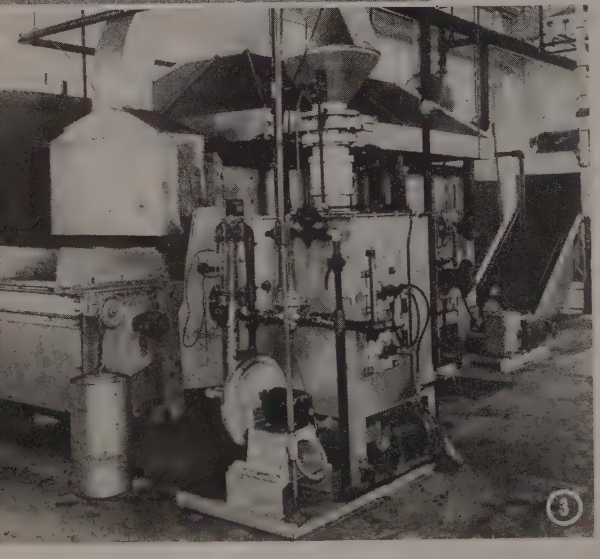


Drop forgings are continuously heat processed from hardening to drawing in an automatic installation based on idea of synchronizing movement through all operations in a predetermined, fully mechanical cycle without intermediate manual handling

CONTINUOUS ...Hardening...Quenching...Washing...Drawing FORGINGS





CO-ORDINATION of materials handling, heating and cooling to save space, time, labor and fuel, and to assure uniformity of product treatment are demonstrated in the automatic, continuous hardening, quenching, washing and drawing installation recently put into operation in a New England drop forging plant. The design is based on the idea of synchronizing movement of assorted steel forgings through all operations continuously in a predetermined, fully mechanical processing cycle without intermediate manual handling.

With the furnaces placed in two parallel lines, the U-shaped installation (see Fig. 1) discharges the finished work at a point near the loading end. Designed and built by W. S. Rockwell Co., Fairfield, Conn., to fit the specific requirements of the user, the setup calls for production of 800 to 1000 lb of assorted forged sockets, handles and miscellaneous wrench parts, as well as other items ranging in weight from several ounces to 1½-lb.

Fig. 1—Diagram of completely continuous conveyor automatic furnace and washing equipment layout. Actually, washing machine is set at right angle to quench equipment. Draw furnace is at right angle to washer and parallel to hardening furnace, reducing overall length

Fig. 2—Discharge end of washing machine, right, and chute to charging end of belt conveyor of draw furnace

Fig. 3—Charging end of hardening furnace. Atmosphere generator is in foreground and conveyor from quench tank is in right background

Only manual operation required to begin processing is placing of the work on an apron of the charging vestibule and pushing slightly forward so that it is fed constantly onto the conveyor belt of the hardening furnace (Fig. 4). Charging end of the hardening furnace is shown in Fig. 3. The endless belt, of cast multiple link alloy type and driven by a variable speed drive, rides through the furnace on top of heavy gas-fired radiant boxes forming the underhearth heating elements, an arrangement which permits direct radiation and conduction to the conveyor and its load. To give uniform heat distribution throughout the length of the furnace, gas-fired hairpin type radiant tubes are located above the belt. This method of heat application prevents the products of combustion from affecting the surface of the steel. Temperature and burner control equipment of the furnace include a recording potentiometer and automatic safety shut-off valves for air and gas supply.

Processed forgings retain a clean, scale-free surface because a controlled protective atmosphere is introduced into the furnace from an atmosphere generator located beside the unit. Charcoal fed, the manufactured gas cracking

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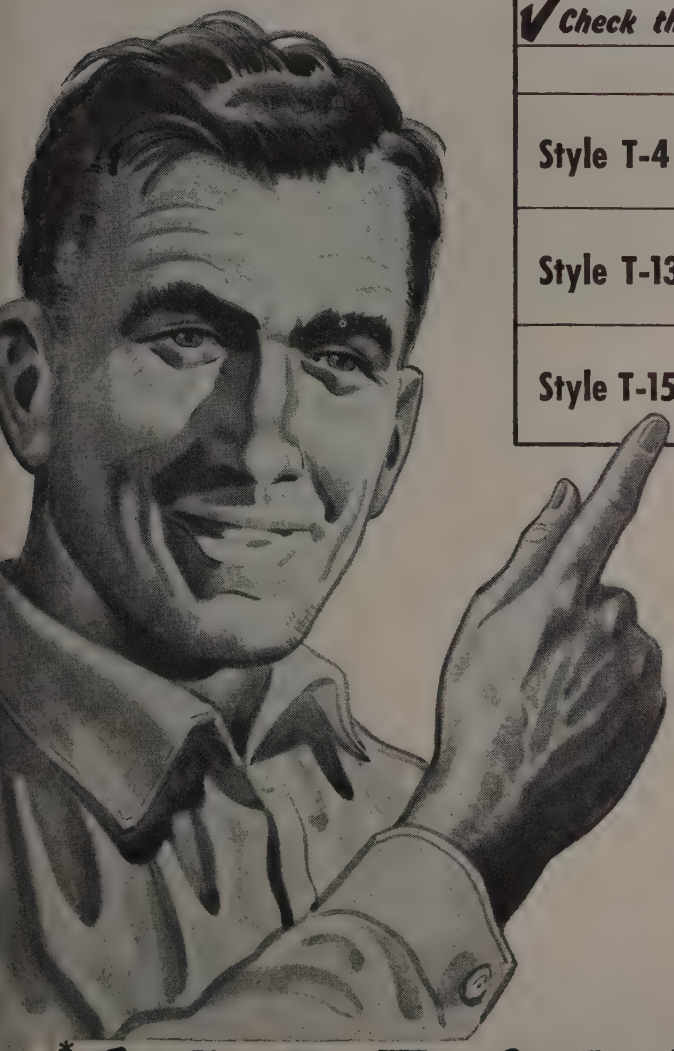

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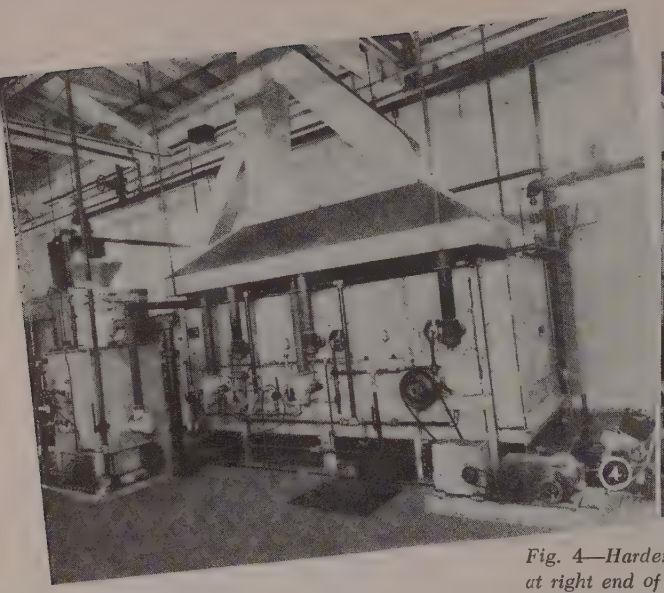

Fig. 4—Hardening furnace and atmosphere generator. Conveyor drive is at right end of furnace and propeller agitator is mounted over quench tank

Fig. 5—Discharge end of draw furnace at right. Conveyor belt emerging from quench tank is at left and washing machine is directly behind instrument panel

unit (foreground in Fig. 1) reforms the gas into a high carbon monoxide, low moisture content type of reducing atmosphere.

Forgings drop off the conveyor belt upon coming from the hardening furnace, dropping through an alloy chute built inside the furnace structure and through an extension immersed in the quench tank. A variable speed motor driven perforated flight conveyor belt immersed in the oil quench tank, able to withstand the constant impact of the falling forgings, takes the work from the apron below the discharge chute on an incline out of the tank, as seen in background of Fig. 3, and which can also be seen at left in Fig. 5.

Quenching oil is kept at the proper temperature by withdrawing it from the cooler end of the tank, circulating it through an automatically controlled shell and tube type cooler, and refeeding it into the tank at the point where the quenching first takes place. Tank is also provided with steam heat to raise oil temperature before running the work through the quench. An agitator creates a turbulent condition in the oil to quench each piece of metal thoroughly, uniformly and quickly.

Coming from the quench tank conveyor the work moves through a chute onto a belt conveyor and through a washing machine located at right angles to the hardening furnace. Steam coils for heating the solution and a recirculating pump are incorporated in the washer which is a spray type alkali cleaning unit. It removes all oil off the pieces, the latter being practically dry upon discharge. Moving through a small chute at right angles to the charging end of the continuous belt conveyor of the draw furnace, the work then moves back in the direction from which it started, as shown in Fig. 2.

Recirculating hot gases, blown down over the work at the discharge end and circulated over the full furnace chamber to expose the charge uniformly, heat the draw furnace. Atmospheric type gas burners firing into an air heater produce the hot gases which are then pulled by a fan and introduced through a duct into the draw furnace and then recirculated back to the heater. A proportioning type potentiometer controller regulates the furnace temperature. Complete combustion and fuel supply safety controls and push button ignition lighting controls are also provided to make the system automatic. Emerging from the furnace (Fig. 5), the work is handled manually for the second time when removing the tote boxes into which the work has fallen from the discharge end of the drawing furnace.

The installation in the eastern plant has, according to Rockwell, several marked advantages besides eliminating practically all manual handling. It moves pieces in relatively "thin" layer permitting uniform exposure in heating and cooling at controlled rate; conveyors are self-emptying; those inside furnace are kept entirely inside the heating chamber, reducing heat losses; and burners and all control equipment are controlled through push buttons, reducing the amount of supervision.

Electric Trucks Increase Warehouse Capacity

Movement of the packed finished product into storage and thence into outward shipment has been speeded up by approximately 50 per cent, and warehouse capacity has been increased by a third through the use of storage battery powered fork-lift trucks in the Chattanooga, Tenn., Appliances Division plant of Cavalier Corp., according to Electric Industrial Truck Association.

Four 4000 lb capacity, 120 in. lift trucks are used in the warehouse—two on the first floor and one each on the second and third floors.

Coming into the warehouse building from production and packaging areas on a chain belt conveyor, cased items are removed from the conveyor manually, slid onto racks and from these picked up by the fork truck and moved to storage areas where the cases are tiered two or three high. Packaged items handled are an oil burning space heater and three sizes of soft drink bottle cooler-dispensers.

Two 6000 lb capacity electrically driven fork lift trucks, operating in the stamping and blanking department, handle sheets of metal from stores into the production line, while bin-skids or flat skids of stamped metal pieces are moved into other departments for welding, cleaning and other operations. Movement of larger assembled pieces to upper sections of the plant is by the conveyor system.

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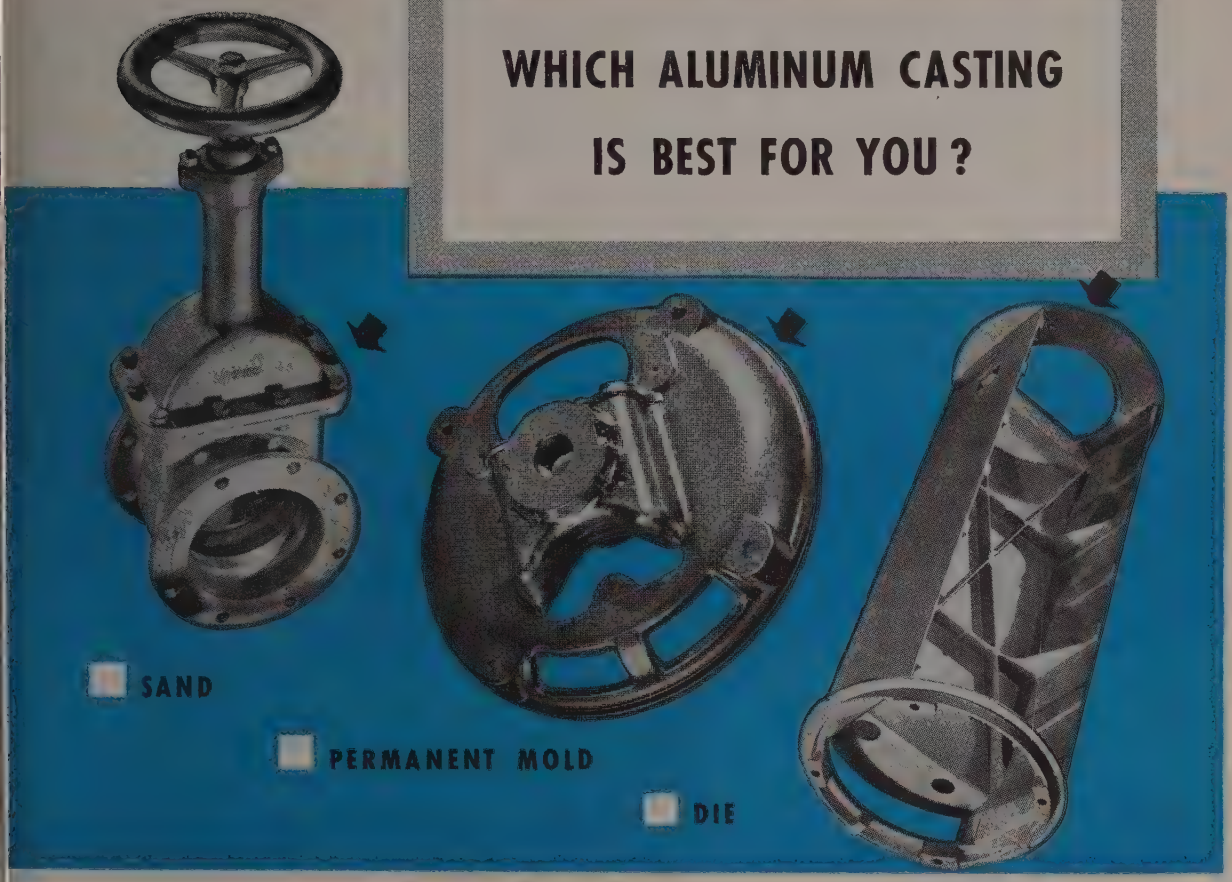

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MASS PRODUCTION

Heat Treating

Flexibility possible in modern equipment is illustrated by special gas carburizing and carbonitriding installations

FLEXIBILITY possible in present day mass production heat treating equipment is well illustrated by several special installations built recently by Holcroft & Co., Detroit. One unit located at a leading automobile plant consists of a continuous two-row pusher-type gas carburizing furnace with automatic oil quench bath, wash and tray return.

This unit includes the following features: Provision for fixture quench, die press oil quench or air cool from the carburizing temperature; control of surface carbon from eutectoid to saturated austenite values; independently variable time cycles on the two rows for desired case depths; agitated bath with provision for hot oil quench to minimize distortion; automatic processing operations, including discharge from the furnace, loading and unloading of quench elevator, control of quenching time, wash and draw; efficient radiant tube gas burners equipped with floating control; improved radiant tube design resulting in long life and easy replacement at operating temperatures.

The cycle commences with the manual loading and pushing of trays through the side charge door into a gas-atmosphere-protected vestibule. The loaded trays are then moved along the two rows at desired time intervals by hydraulic pushers. Furnace zone temperatures are regulated so that the load is heated to the carburizing temperature at a uniform rate. Temperature of the final zone is set according to the requirements of the hardening operation.

Gears requiring a die press quench are removed manually from the end of the furnace through hydraulically-operated slot discharge doors. This feature minimizes exposure of the gears to air, inasmuch as they can be held in the furnace until ready for quenching.

Fixture quench trays are automatically moved to a side discharge vestibule and then to the elevator for the automatic quenching operation. After quenching, the gears move along open-air tracks to the wash tank and draw furnace. The trays are then unloaded and returned to the loading platform.

The carburizing atmosphere consists of catalytic generator gas with additions of propane or natural gas. The generator gas acts as a diluent to the carburizing gases (propane or natural gas) and is added in quantities to provide an ade-

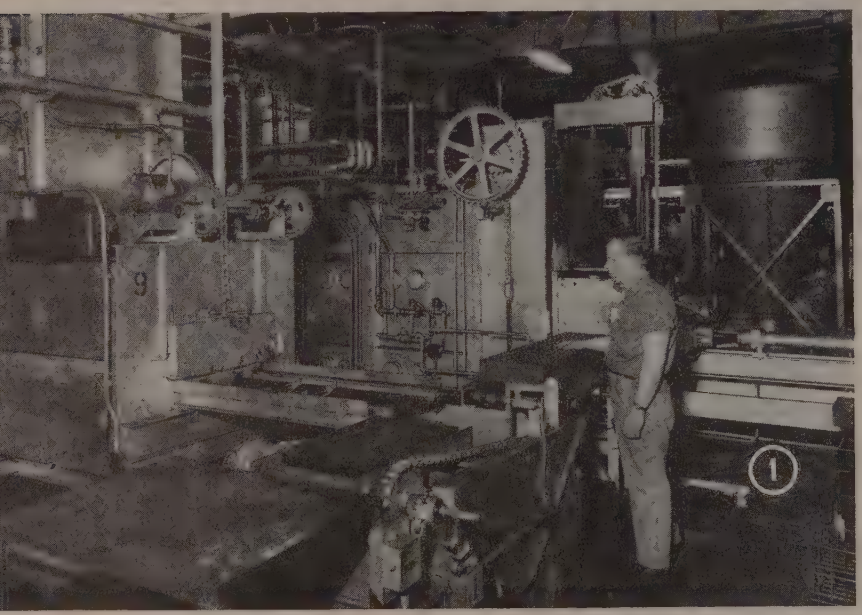
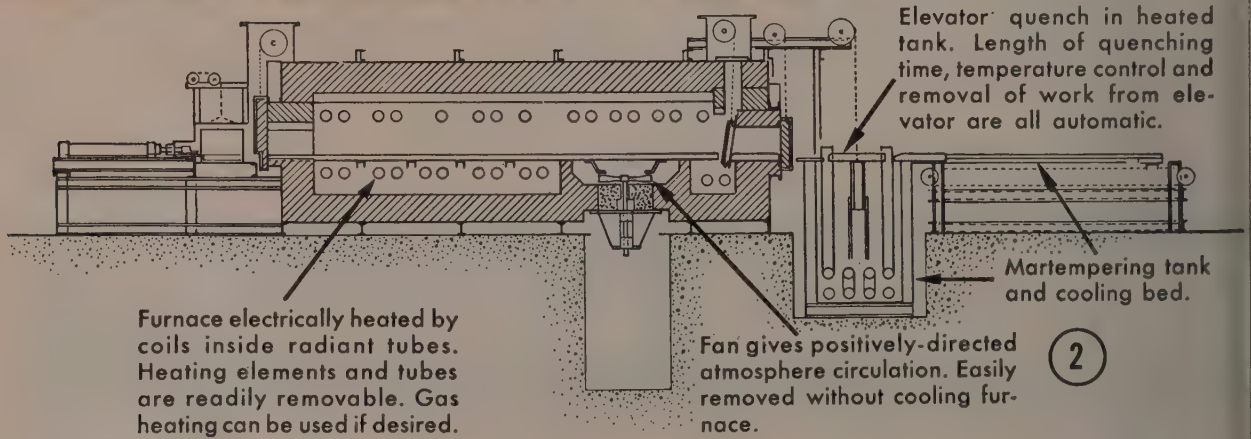


Fig. 1—Electrically heated radiant tube single-row carbonitriding furnace designed to case harden small parts densely loaded in bulk

Fig. 2—Plan drawing of furnace shown in Fig. 1


Elevator quench in heated tank. Length of quenching time, temperature control and removal of work from elevator are all automatic.
Martempering tank and cooling bed.
Furnace electrically heated by coils inside radiant tubes. Heating elements and tubes are readily removable. Gas heating can be used if desired.
Fan gives positively-directed atmosphere circulation. Easily removed without cooling furnace.
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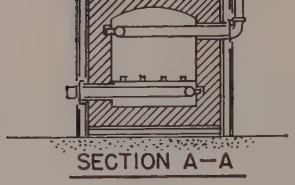
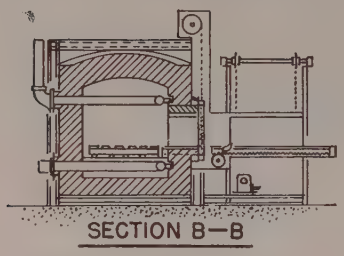
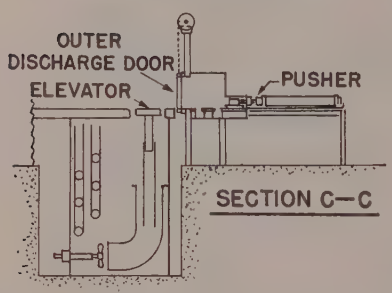






quate furnace pressure. The carburizing atmosphere can be regulated to control surface carbon concentrations ranging from eutectoid to saturated austenite values. The controlled carbon case and the hot oil quench bath give the furnace metallurgical as well as mechanical flexibility.

Carbonitriding is a case-hardening process that is rapidly finding wide use in industry. The wear-resistant case is produced by a controlled furnace atmosphere consisting of a carburizing gas with an anhydrous ammonia addition. On plain low carbon steels the process produces a uniform file hard case with great temper resistance. A medium carbon steel can be carbo-nitrided and subsequently drawn at high temperatures for excellent core properties without affecting the case hardness.

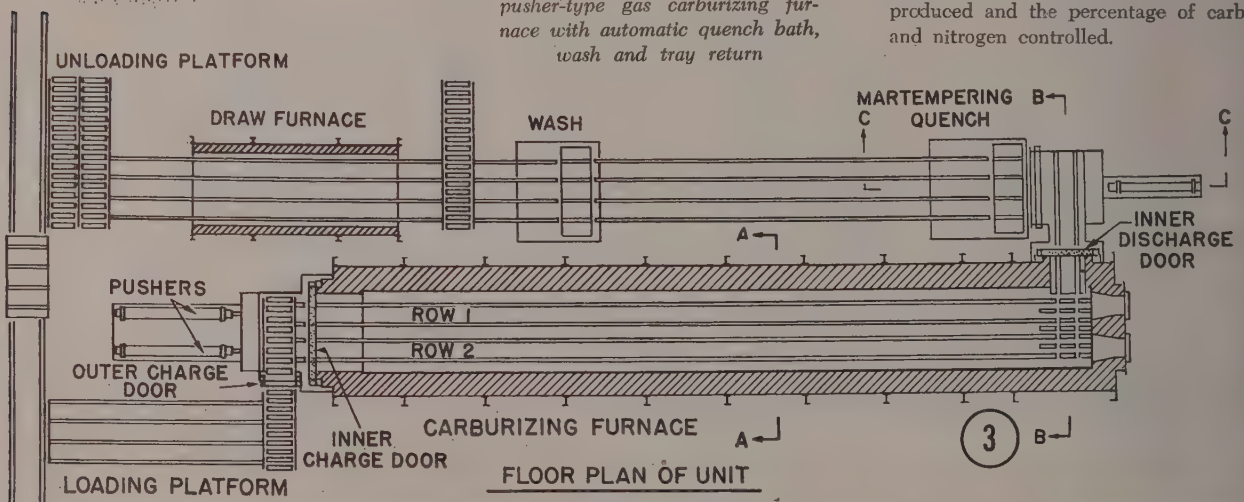
Holcroft & Co. recently installed an electrically heated radiant tube single-row carbonitriding furnace to case harden small parts densely loaded in bulk. The design includes a circulating fan which insures even gas distribution and uniformity of temperature throughout the load, and features an agitated quench bath with provisions for automatic hot oil quench.

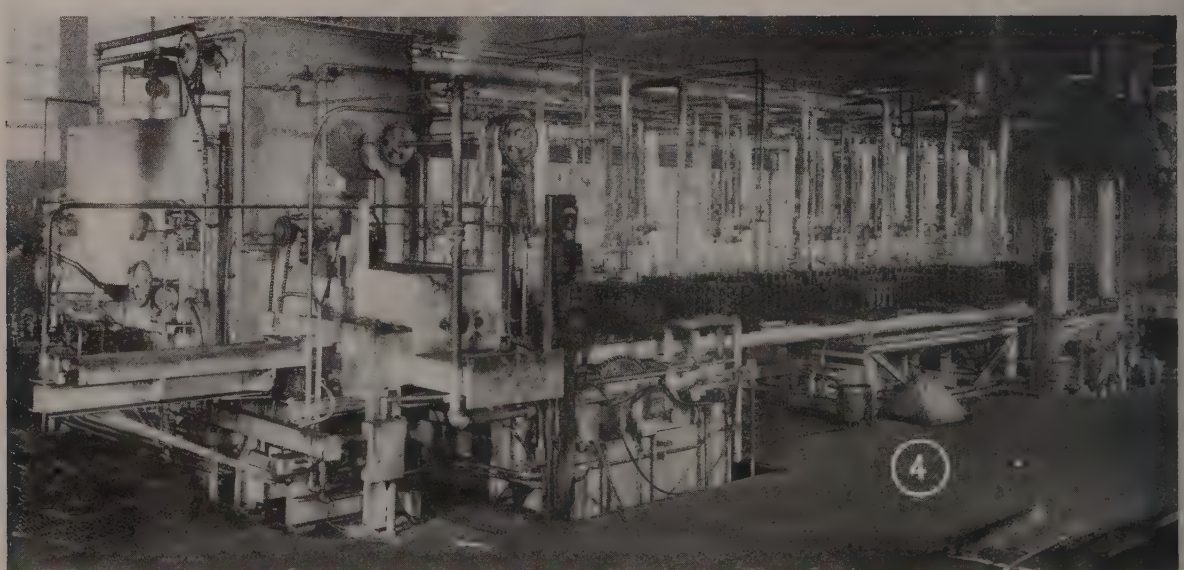
The parts are loaded into trays and moved into the furnace vestibule by hand. They then travel through the furnace at a predetermined push interval, uniform heating being provided by three-zone temperature control.

The trays are automatically moved from the quench to the wash and draw operations, and are then unloaded and reloaded manually at the same work station, adjacent to the furnace charge door. All processing operations are arranged so that a minimum amount of floor space and stock handling is required. By varying the operating time and temperature as well as the gas composition, any desired case depth may be produced and the percentage of carbon and nitrogen controlled.

Fig. 3—Floor plan of unit shown in Fig. 4

Fig. 4 — Continuous two-row pusher-type gas carburizing furnace with automatic quench bath, wash and tray return





Grinding Costs

(*Continued from Page 72*)

eliminated, wheel cost is the only determining factor in grinding cost; and it follows that the harder the wheel the lower the grinding cost.

Such a theory is definitely fallacious, since with any given bond, the cutting action of a grinding wheel and the life of a grinding wheel are opposed. As either is increased, the other is decreased. Therefore, except in extremely rare cases, an increase in wheel life is necessarily accompanied by a decrease in the rate of removal, or in hourly production. The saving in wheel cost beyond a certain point is more than offset by a correspondingly greater increase in labor and overhead cost.

Relative to this point, there is the case of a steel foundry. Over a period of 6 or 8 months this plant gradually increased the hardness of its floor-stand snagging wheels—against the advice of abrasive engineers. The superintendent of the cleaning department soon found himself facing several difficulties. His grinders were unable to keep pace with the production of the foundry, which resulted in delayed shipments of the finished castings. Huge piles of castings waited to be ground.

Actually, this cleaning department decreased its capacity by 18 per cent. Since the supervision and nonproductive labor were not correspondingly decreased, this automaticlly increased the labor and overhead cost per unit ground. Further, the piles of castings occupied valuable floor space and tended to disrupt other operations, resulting in loss of efficiency. The superintendent's solution to this undesirable situation was the purchase of two additional double-end floor-stand grinders.

To summarize, the superintendent had: (1) Decreased the capacity of the cleaning room, thereby increasing departmental overhead; (2) disrupted the efficiency of chippers, welders and torch-cutters by causing crowded floor conditions; (3) invested in two additional machines which previously had been unnecessary; and (4) increased his costs with the addition of new operators on the payroll. But the major damage caused by this ill-advised move came in the form of increased direct labor cost. Although the hardness of the wheels was increased gradually, the operators soon discovered that they were unable to attain their daily pay rate even when they exerted themselves beyond normal requirements.

This result was inevitable since, when the operators' rates were established, the hardness of the wheels was correct for the grinding operation. The unsatisfactory condition led to controversy over the established rates and finally forced a restudy of rates. After a review by a joint committee of management and union representatives, the wage level was increased 8 per cent. The superintendent now began to realize the folly of not having a practical method of testing his grinding wheels and of not employing a cost system which reflected his actual grinding costs with all factors considered.

PUSHES AND PULLS LOADS: Designed with a flattened nose to provide surface for pushing loads, the Clarkat towing tractor shown here is manufactured by Clark Tructractor division of Clark Equipment Co., Battle Creek, Mich. Demonstrated at the recent materials handling show in Cleveland, the tractor has standard automotive type transmission with three speeds forward and one reverse, and improved steering

What constitutes a practical method of testing wheels cannot easily be stated, for each individual test is necessarily directed according to the prevailing local conditions of a particular grinding operation. However, there are certain fundamental factors which must be taken into account in every trial. Basically, we desire to know: (1) How long the wheel will last; (2) how much work the wheel will accomplish during its life; (3) how much work the wheel will accomplish in a given period of time.

The life of the wheel is not in itself a determining or even an indicative factor. Unless accompanied by a proportionate amount of metal removal per given period, long wheel life becomes a problem instead of a solution. Of primary interest in a grinding wheel test is the determination of the ratio of wheel wear to metal removed and the rate of metal removal. To obtain truly conclusive results these two elements must be measured accurately. Then, to reflect actual grinding costs in a practical cost system they must be evaluated properly.

An abrasive engineer's first step toward obtaining accuracy and consistency in a test is to eliminate, neutralize or average all existing variable factors which would otherwise alter the true results of wheel performance. Foremost of these is the human element. The operator varies the tempo at which he works and the effort he expends. Another major variable is the condition of the grinding machine. On swing frame and floor stand machines the condition of the bearings and spindles is capable of effecting a 50 per cent variation between two wheels of the same specification.

The third variable is the nature of the material ground. Even though the analysis of a metal is held within controlled limits, the variation between these limits can definitely affect the grinding efficiency of a wheel. Also to be considered are questions such as whether the area ground is sharp and narrow or broad and flat, and whether this area is readily presentable to the wheel. To obtain the true results of a test, all of the variables mentioned must be neutralized or averaged. This may be accomplished in the following ways:

The human element may be neutralized by limiting the test to the same operator or to the same group of operators. For example, it would not be practical to test one wheel specification on machines 1, 2, and 3, while another specification is tested on machines 4, 5, and 6. The difference in the abilities of the operators could very well reverse the true results.

The variable between machines can be dispensed with in the same way as the human element by using the same machine or the same group of machines throughout the test.

The variable in material ground must be averaged rather than neutral-

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ized. This can be effected by limiting the metal to one grade, and by grinding the same type, or at least similar types of pieces throughout the test. In the case of castings, the area ground must be similar. Intermingling sharp and narrow fins freely with broad and flat pads would give inconsistent results.

Most practical way to eliminate the variables in a test is to average them out by running off a sufficiently large number of wheels. In this way, if all the operators and machines are employed, the variations will offset each other, and, in most cases, the time span of the test will allow for grinding an average analysis of the metal between the controlled limits. In the case of the foundry, the time span makes it possible to grind a cross section of the types of castings it normally produces. In the case of steel mills, it is possible to grind an average surface condition.

There is a wide difference of opinion as to how many wheels should be run off in a test of this type. For the average billet or slab grinding operation, it is the writer's opinion that 100 to 300 wheels must be tested to receive true and conclusive results, depending on whether the existing variables are at a minimum or maximum. Testing on a smaller scale has merit in initial trials where several grades of grinding wheels are tested, since the primary purpose of this type of test is to determine which grade is to be tried extensively.

In foundries where the wheel consumption is usually not so great, the number of wheels to be tested is necessarily smaller. If the test can be limited to one particular type of casting and all the other variables are well neutralized, 12 wheels will suffice to present a true picture of their average performance. If, however, the variables cannot be averaged or neutralized for the test, 25 to 30 wheels should be considered a minimum.

A question frequently put to our abrasive engineers is: "Must the grinding cost be based on pounds of metal removed or will it be sufficient to find the cost per ton of metal ground?" The answer to this is determined by the local conditions of the operation in question. In most foundries, especially in jobbing foundries, it is necessary to find the pounds of metal removed because the total weight of the various castings is not always proportional to the amount of metal removed from them. To illustrate this an excerpt from one of our recent tests is shown in Table I. This foundry based its cost on the tons of castings ground. Had it restricted the test to one type of casting the results would have been indicative, but since it had not, the results of this test were virtually without value.

You will note in this chart that wheel A appears to be superior since it ground a greater number of castings, totalling 15.579 tons. Wheel B ground five castings less and totalled a mere 10.914 tons. But upon closer investigation you will note that wheel B has actually done more work, since it removed 684 lb of metal to wheel A's 597 lb.

To illustrate how the use of an improper determining factor in a test can actually reverse the indications of a wheel's efficiency, we calculate in Table II for both wheels A and B the cost per ton castings ground as opposed to the cost per pound of metal removed. It is seen that using the foundry's method of determining cost per ton ground, wheel A is 27.5 per cent more economical than wheel B. However, using the correct determining factor of pounds metal removed, wheel B is actually 15.66 per cent lower in cost.

It is obvious that to have established the true efficiency of a wheel in this case, it would have been necessary to base grinding costs on pounds metal removed rather than tons metal ground. Therefore, we develop the following axiom: Unless the proportion of pounds metal removed from a casting to the total weight of that casting is constant, it is necessary to base grinding cost on pounds of metal removed.

Calculating the Cost

On the other hand, if cylinder sleeves only, as an example, were being ground on a floor-stand machine as a steady operation, it would not be incorrect to calculate the costs on a tons ground basis. Here the removal per cylinder sleeve would be consistent and the number of sleeves ground during the life of the wheel would average the removal quite well.

The same principles apply in the cases of billet and slab grinding. If the size of the billets or slabs to be ground remains unchanged throughout the test, it is not essential that weight removal be taken. Although there will be a variation in percentage of removal between billets due to inconsistent surface qualities, grinding a large number of billets will average the removal per billet. However, if there is a difference in the sizes of the billets ground, then weight removal must be taken.

For instance, a steel mill grinding one billet 6 x 6 x 72 in. weighing 734.4 lb, removed 22.03 lb of metal, while on another billet 3¾ x 3¾ x 192 in., weighing 764.8 lb, 32.12 lb of metal were removed. If a tonnage-ground basis had been used, the wheel would have received approximately the same credit for grinding each billet. On a pounds removed basis, it is plain to see that in grinding the second billet the wheel had accomplished about 50 per cent more work. For the same reason it is incorrect to compare the costs per ton ground in sheet bar grinding to those of billet or ingot grinding, as the proportion of total weight ground to metal removed and square feet of surface conditioned varies.

Another question arises over contact time (actual grinding time) as opposed

NEW LITERATURE

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By Ready-Power Co., 11231 Freud avenue, Detroit 14. Discusses design features, operating costs and specifications of various models of engine compressors.

SYNCHRONOUS MOTOR STARTERS
By Electric Controller & Mfg. Co., 2700 East 79th street, Cleveland 4. Bulletin describes synchronous motor starters for 600 v or less and also for 2300 to 4600 v service.

CUTTING FLOOR MAINTENANCE
By Walter Maguire Co. Inc., 330 West 42nd street, New York 18. Bulletin stresses reduction of floor maintenance costs through use of Emeri-Crete flooring. Also includes test data on installations.

TRANSVERSE TESTING MACHINE
By Steel City Testing Machines Inc., 8843 Livernois avenue, Detroit 4. Describes new 10,000 lb capacity machine and other models of brinell testing machines.

CORROSION RESISTING FANS
By Duriron Co. Inc., Dayton 1, O. A 12-page bulletin giving complete engineering data including dimensions and capacities of five standard sizes of fans made by the company. Some typical applications are shown by drawings.

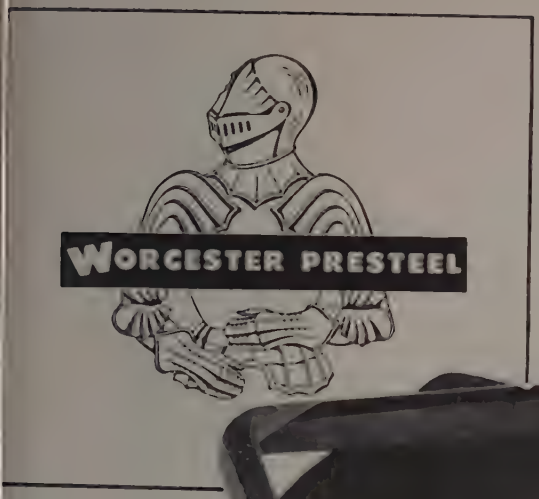
SPRAYWELDER
By Wall Colmonoy Corp., Fisher Building, Detroit 2. Four-page bulletin describing use of Spraywelder and properties of the alloys used in the process.

REMOTE TRANSMISSION SYSTEMS
By Brown Instrument Co., Philadelphia 44. A 24-page illustrated booklet explaining operating features and giving a comprehensive description of component parts which make up the system.

INDUSTRIAL FURNACES
By Surface Combustion Corp., Toledo 1, O. Bulletin gives brief description of design and use of eight of the company's furnaces.

APPLICATIONS OF FAXFILM
By Faxfilm Co., 1220 West Sixth street, Cleveland 13. Discusses applications of Faxfilm in the study of surface condition.

UNIT PUMPER
By National Supply Co., Toledo, O. Booklet describes line of pumpers, tells how they are named and what they are made of. A specifications list is also included.



A Good Example

of **Deep-Drawing in Light Aluminum Stock**

Pictured here is an aluminum case for a portable electric megaphone* (which, incidentally, amplifies the human voice 2500 times, and delivers messages with clarity over distances of more than a mile). This case measures 12″ x 8″ x 8″ and was deep drawn from 52S aluminum .040″ thick. Tools had to be precisely designed and drawing operations carefully controlled to avoid tearing such thin stock. However, with 63 years of experience in handling all types of precision work, the job presented no particular problem to Presteel engineers. Presteel also welcomes any intricate problem in part or product redesign which may be solved by the use of modern high-speed presses. Send samples or blueprints.

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to total operating time in figuring wheel life. Here, again, on certain grinding operations it is necessary to use contact time while on others this is superfluous. Usually, in foundry swing frame operations, handling and setup time vary considerably for different types of castings. This necessitates the use of contact time, since the time that the wheel is in contact with the casting might constitute as little as 50 per cent or as much as 70 per cent of the elapsed time of the grinding operation.

In most steel mills, though contact time is dependent on the efficiency of the crane service and several other lesser factors, such as "turn-over" devices, it has been found to be of a very consistent percentage of the total time in grand scale tests. Under these conditions contact time is not really essential. But if conditions in a steel mill are such that handling time varies considerably, then contact time must be taken.

For instance, if an operator grinds small billets which he is able to handle manually, the contact time during a given period will be greater than in the case of grinding 300 or 400-lb billets where the crane is used to remove the finished billet and place another on the grinding bed. On the other extreme is the case where very large slabs are ground. The operator may grind as long as 2 hours without interruption, thus making contact time 100 per cent of the 2 hours of total time. Where contact time is necessary it performs a dual function. First, it is a true indicator of wheel life. Second, it helps to determine a true rate of removal.

Thus far we have restricted our discussion to measuring accurately the two elements of a test, namely, the ratio of wheel wear to metal removed and the rate of removal. Although these two elements of a wheel test are measured accurately, one important function still remains—the evaluation of these elements in a formula that gives actual grinding costs. This may be accomplished by the use of the following equation:

$$\text{Total grinding cost} = \frac{\text{Wheel cost} + \text{labor and overhead}}{\text{Pounds metal removed or tons metal ground}}$$

Where the wheels are used to discard size, wheel cost equals the total purchase price of the wheels. If the wheels are only partially used, the wheel cost equals the percentage of the wheel consumed multiplied by the purchase price of the wheels.

Labor and Overhead: In this formula the labor and overhead figure is of prime importance. In order to reward a rapid rate of removal the labor and overhead figure must be based on an hourly rate. On this basis it is evident that a wheel removing a given number of pounds of metal in less time than another wheel removing the same given number of pounds, will be charged with a lesser labor and overhead cost. Should the labor and overhead figure be set at a fixed amount per ton metal ground, it becomes a constant factor in the formula, irrespective of the rate of removal. In the comparison of the grinding cost between any two or more wheels, the labor and overhead figure being constant in each formula, is automatically cancelled out, leaving wheel cost as the only determinant of wheel efficiency.

One steel mill used the flat sum of $10 per ton ground as labor and overhead. The mill simply added the cost of the wheel per ton ground to the sum of $10 with the intention of arriving at the total grinding cost per ton metal ground. Using this system, the mill disregarded comparative rates of removal between two wheels, and thus failed to obtain true results. Wheel A in Table III ground 4.5 tons of metal in 16 hours, while wheel B ground 4.3 tons of metal in only 14 hours. It was not logical to charge the wheels in both these instances with an equal labor and overhead per ton, since wheel B produced an almost equal amount of work in 2 hours less time. Yet wheel A was selected as superior on the strength of a lower wheel cost, giving no credit to wheel B for a greater rate of removal.

Substituting an hourly labor and overhead rate of $3.20 for this mill's $10 per ton labor and overhead figure, it can be seen in Table III that wheel B actually shows a savings of 96 cents per ton ground in labor and overhead cost. It is obvious, then, that the only way to give a wheel just credit for its ability to cut faster is to charge a certain hourly labor and overhead cost against that wheel.

It is often said that as long as the same hourly labor and overhead rate is employed for all grinding tests whether or not the rate approximates the actual labor and overhead cost is immaterial. This is not true. As evidence we list below the results of a recent test, Table IV, in which grinding costs were calculated with three different hourly labor and overhead figures. The purpose of citing this case is to show clearly that the use of incorrect labor and overhead figures is not only misleading but can completely reverse the true results of the test. Ten wheels, each of five different specifications were tested.

You will note in Table IV that in the first case using $4 per hour as labor and overhead the order of superiority (lowest cost) is A, C, D, E, B. Wheel A is 0.588 per cent lower in cost than its nearest competitor, Wheel C. In the second case, using $2 per hour as L&O the order is C, A, D, E, B. Now wheel C is 1.354 per cent lower in cost than its nearest competitor, wheel A. In the third case, using no L&O figure, the order of superiority changes again—to E, D, C, A, B. Now wheel E ranks first by 12.92 per cent over its nearest rival, wheel D.

Now the question arises as to which of the above gives true results. For this particular foundry the results based on $4 as labor and overhead were established as correct. If $2 had been used for labor and overhead, the rate of removal would not have been properly evaluated and the ratio of wheel wear to metal removed would have been abnormally favored. If no labor and overhead figures had been used, wheel cost per pound metal removed would have been the only factor determined.

In summary, we are now aware that a grinding wheel test cannot be haphazardly conducted and yet produce true, conclusive results. A test must be planned carefully and a survey made of the local conditions of the particular operation to determine: (1) Whether pounds metal removed must be found to serve as a determining factor or whether the use of tons castings ground will suffice; (2) whether or not handling time varies sufficiently to warrant taking contact-time; (3) whether a small or large number of wheels must be run to dispense with the other existing variable factors; (4) the correct hourly labor and overhead figure that will reflect actual labor and overhead costs.

Used in a correct cost formula, the results thus obtained will produce accurate total grinding cost, on which is based the selection of the proper grinding wheel for swing frame and floor stand operations.

Refined Control Systems Better Locomotive Behavior

Increased protection for the diesel engine is possible with control systems developed in the past two years for diesel-electric locomotives. Furthermore, the systems materially improve performance and allow for faster terminal maintenance, according to M. D. Henshaw, General Electric Co., Schenectady, N. Y.

Arrival of new and larger diesel power units for locomotive service, he pointed out, required that new standards be created in precision control of engine speed, engine loading and in such associated matters as control of engine cooling water temperatures. Generator and motor improvements have likewise required more precise handling of the rotating electrical equipment.

Coatings for Aluminum

(*Continued from Page* 78)

or solvent vapor which might be trapped in the pores of the metal, and insures a perfect finishing operation. Since cast aluminum objects vary in size, the protective coating used must be in keeping with the use of the article coated.

Finish on nearly all cast objects must, first, be decorative. Hammer and wrinkle effects are entirely suited to this purpose for they tend to minimize inherent surface imperfections in the casting. In many cases, the coating must be durable as well as decorative. The vacuum cleaner finish, for example, must be scuff resistant, the reflector finish, heat resistant. Where extreme durability is required, at least a two or three coat system is necessary. A suitable primer, often of the zinc chromate type, is suggested to insure adhesion of the finish coat. The second and third coats must be specific in type—whether to withstand chemical action, as with laboratory apparatus, or outdoor exposure, as with aircraft accessories.

Difficulties encountered in finishing castings are generally due to the finisher's erroneous assumption that coatings for aluminum castings are the same as those used for other metals. Such an assumption results in an inferior finished product, for several reasons. The paint film may, for example, show sufficient initial hardness and adhesion. Upon aging for several days, however, many finishes oxidize and become brittle, to the point of chipping or cracking readily. This can be avoided only if the finisher utilizes coatings formulated especially for use on aluminum castings.

Extrusions of wrought aluminum may be considered in two classes—light and heavy gage. The light gage, such as collapsible tubes, present a set of finishing problems entirely different from any other type of aluminum mentioned up to this point. Method of cleaning tubes prior to finishing also demands special attention. Since a very thin film of lubricant remains on the metal after extruding, it is desirable to clean the aluminum either with an inhibited alkaline cleaner, followed by an acid and hot or cold water rinse, or by solvent vapor degreasing.

After cleaning, interiors of tubes are sprayed or flushed with some type of automatic equipment. In all cases, the coatings used must be extremely flexible. In addition, interior finishes should usually be tasteless, odorless and nontoxic. Often they must display outstanding chemical resistance as well. The coatings which most nearly fulfill all these requirements are the phenolics, although vinyls are also coming into wide use.

Function of the exterior collapsible tube coating is principally decorative. Applied by roller coating, it must display superior gloss, depth, coverage and flow. The prime requisite, however, is that the painted surface lift inks with maximum clarity by means of a dry printing process. When a clear resistant finish is not used, it may be necessary that the base coat be resistant to the contents of the tube. Where extreme resistances are involved the use of a clear finishing varnish is recommended.

Package Maintains Sales Appeal

The manufacturer who packages his product in collapsible tubes rightfully demands that his package maintain its original sales appeal. It is detrimental to future sales if, on aging, the collapsible tube coating loses its flexibility to the extent of flaking off. It is most essential that both the interior and exterior coating resist attack by the packaged contents. Since it is frequently necessary to obtain optimum results with minimum baking temperatures, the finisher must select those coatings which have been formulated with greatest care.

Forgings and heavy gage extrusions are essentially the same, where the finisher is concerned.

Heavy gage extrusions are manufactured in thicknesses up to 10 in. in width, and serve a variety of uses—from modern tubular furniture to the structural members used in streamline trains. They are also finding increased use as architectural or structural forms, where high strength and light weight are important factors.

Method of cleaning the extruded object prior to finishing depends both on its size and ultimate use. It is not practical, for example, to use a cleaning operation which will etch the metal on tubular furniture or other items where a very smooth painted or polished surface is required. Instead, solvent degreasing of some type, used just before the finishing operation, would be more suitable. On the other hand, inhibited alkali followed by acid and a hot or cold water rinse is one of the most commonly used methods on large structures, for it can be applied by more practical means than other cleaning treatments.

Like the prefinishing methods, the protective coating or coating system chosen must be in keeping with the end use of the article. A clear vinyl solution offers a marproof finish which improves the brilliance of highly polished aluminum. Such a coating must, however, be formulated with the proper choice of resins and plasticizers in order to insure a tough, flexible "water-white film." A balanced solvent combination which contains the correct percentage of slow solvent to allow the film to flow out smoothly, combined with faster solvents which cause the finish to set up quickly, preventing contamination by dust and dirt, is also essential.

For such items as furniture, a decorative pigmented coating, often a urea-alkyd type, is required. In either case, the marproofness and adhesion obtainable only in a baked finish are essential. For exterior use, a 2-coat system is always recommended, and should be tested thoroughly for weather resistance.

The finisher is faced with a dual problem in painting structural or architectural forms. The first is the initial finishing, including application of a suitable primer. The zinc chromate type primer has been widely accepted for use on aluminum, for it forms a corrosion-resistant bond between the metal and the finish. It is important, however, to select the right zinc chromate primer. While it has long been known as a cor-

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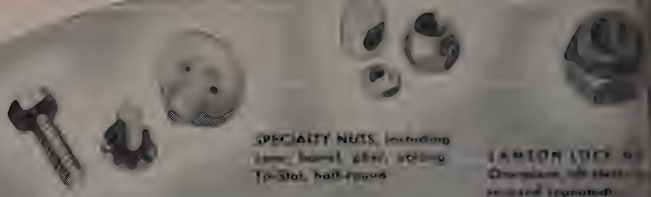

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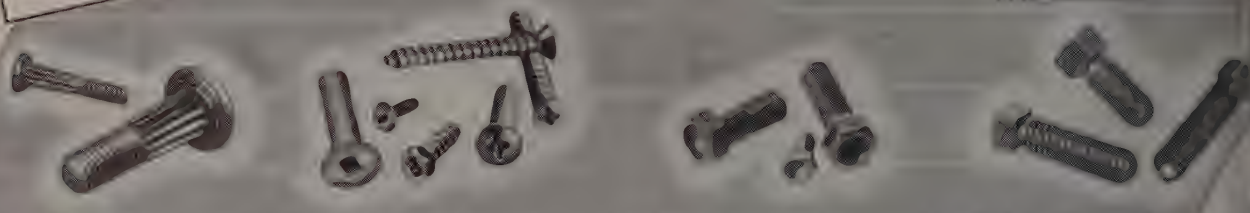

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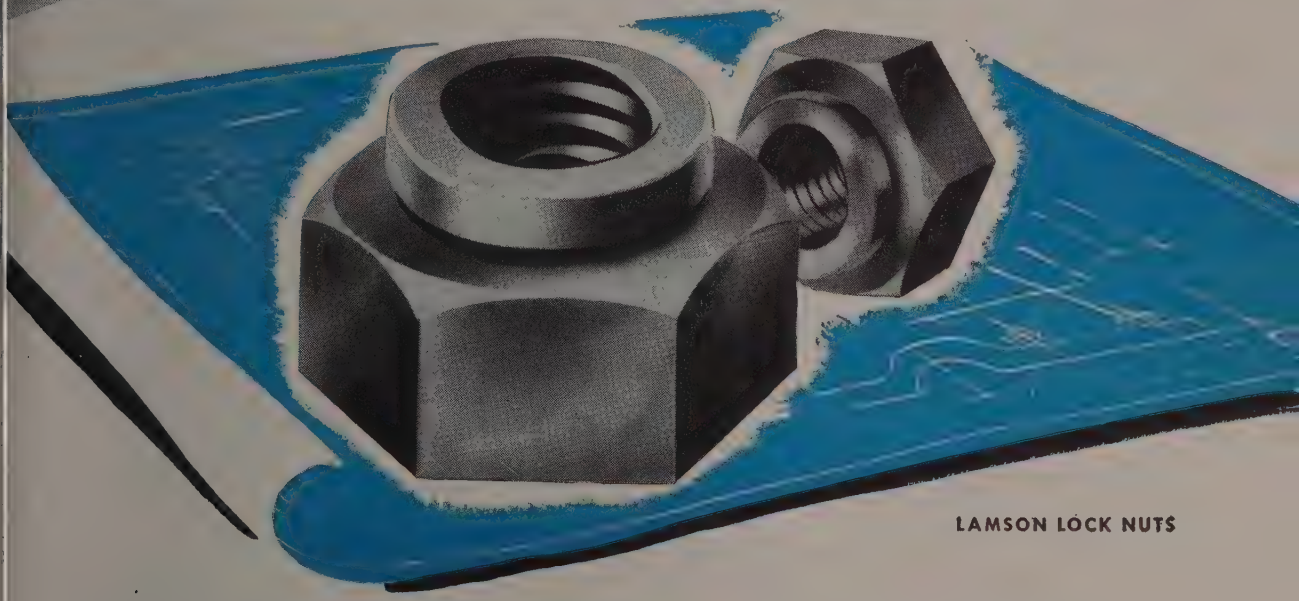

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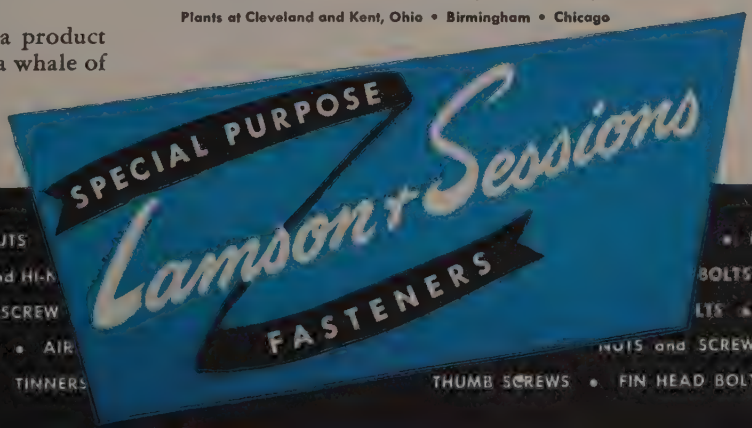
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rosion-inhibitive pigment, zinc chromate alone is not enough. It must be suspended in the proper vehicle. The entire value of the zinc chromate is lost unless the vehicle bonds itself completely to the aluminum surface to prevent entrance of moisture and underfilm corrosion.

Exterior durability, of course, is the primary quality of the finish coat or coats. Superior durability is attained through the use of long oil finishes, either alkyd or oleo-resinous. Where structural forms are being coated prior to assembly, it is possible to obtain maximum durability with a baked urea-alkyd finish.

Problem of Repainting

The finisher's second problem is repainting, for which the same outline of operation may be followed, i.e., application of primer to bare metal, after thorough sanding, followed by one or two weather-resistant finish coats.

Sheet aluminum, like extrusions, can be obtained in all gages, from the heaviest type used for such structures as bridges and cranes, to the lightest gage which is foil. Here, sheet aluminum is discussed as: Heavy gage structural sheet, medium to heavy gage architectural sheet, medium to light gage sheet and foil.

The finishing of the structural sheet need not be treated extensively here. It may be handled in the same manner as structural extrusions. But the finishing of architectural sheet depends upon whether the metal is intended for interior or exterior use. For the former, a common method of cleaning is the use of inhibited alkali followed by phosphor or chrome acid treatment and a hot or cold water rinse. For exterior use any of the following cleaning methods may be used prior to priming: Chromadizing, phosphating, chemical or electrochemical oxide coating and solvent-phosphoric acid cleaning. A primer should be used which will stop any film corrosion formed by moisture, leaving a surface which is readily adaptable to a variety of finish coats.

One of the important uses for medium-heavy gage aluminum sheet today is in the prefabricated housing field. Prefabricated building sections may be finished in several ways. Generally, spray application is most satisfactory, both for primer and finish. Interior sections may be primed at point of manufacture and finished by brush or spray after assembly.

Since prefabricated building sections cannot easily be cleaned for painting, the primer coat must perform the following functions: It must wet the very fine surface oxide present on aluminum; it must adhere well over hand marks; its surface tension must be closely regulated to prevent "crawling"; it must be sufficiently flexible to withstand a cold bend test, as well as constant minor vibrations, and it must have sufficient "tooth" to hold the finish coats. In order to combine all these properties, the primer must be formulated and manufactured with great precision and care.

The finishing shop coat, often of the stucco type, must be formulated so it anchors firmly to the primer surface. Like all first grade exterior finishes, chalking must be carefully controlled and the coating must be weather-resistant.

The third class of sheet aluminum, medium to light gage, marks a departure from the heavier gages both in prefinishing and finishing treatments. While it may be cleaned in the same manner as architectural sheet, the lighter material is more usually only solvent cleaned or, in some cases, used directly as it arrives from the mill.

Advantages of Roller Coating

Although it may be finished by spraying, it is often of greater advantage to roller coat lighter gage metal prior to fabrication. The container and closure industry, for example, utilizes this method completely. More recently, simulated vitreous tile finishes and coatings for metal awnings are also successfully applied in this manner. Roller coating offers the dual advantage of evenness of film and consequent maximum protection, at minimum cost.

A variety of finishes are obtainable for roller coating application, each with specific properties. The interior food closure lining, for example, is nontoxic and withstands processing, whether it be an oleo-resinous gold lacquer, or a vinyl or synthetic white coating. The exterior closure coating must, in addition, often be resistant to the contents of the package.

Roller coating finishes for the container and closure industry must be formulated with the knowledge that the first coat may have to withstand four or five subsequent baking operations, yet retain its initial flexibility for fabrication. Following is the pattern of a typical closure finishing process:

First coat—an interior resistant gold lacquer, possibly vinyl; second coat—a vinyl size for the exterior; third coat—a base white coating applied over the size; fourth coat—one to four lithograph prints baked one or two at a time, depending on the type of equipment used; and fifth coat—a resistant finishing varnish over the inks.

Each of the first three coats is baked in a conveyor oven before application of the succeeding one. The inks are baked as outlined above. The lithographer may apply his last print to the plate and varnish while the ink is still wet, to save a baking operation. The "wet print varnish" must be carefully formulated so that it does not cause bleeding of the inks, yet retains the depth, clarity and other requirements of a finishing varnish.

Vinylite Finishes Recommended

Each of the coatings mentioned above is baked 10 to 20 min at temperatures ranging from 220 to 375° F, yet the finished sheet must fabricate perfectly and must, in many cases, resist sterilization or processing as well. High solids vinylite finishes are ideal for this application because they are nonoxidizing and, therefore, retain outstanding fabrication properties even on extended aging. Their high nonvolatile content affords maximum hiding power combined with low cost of applied solids.

Foil, which is essentially the same as very thin sheet aluminum, presents an entirely different phase of application. Since foil which is to be coated is generally annealed at point of manufacture, no further prefinishing treatment is necessary. It is supplied in roll or coil form, and may be coated by either a roller, reverse roll, gravure, or knife coating method.

Aluminum foil might be called the metal of the paper industry, for it lends itself to such uses as flexible food packages, bottle wraps, closures and closure liners.

ACKNOWLEDGEMENTS

The authors wish to express their appreciation to Mr. Robert I. Wray of Aluminum Research Laboratories, Aluminum Co. of America, and to Mr. Ira R. Messer, vice-president, Mr. James W. Lenigan and the Watson-Standard Co.'s research staff, for their technical assistance and encouragement in the writing of this paper.

Hydraulic Brake Fluid Standard Approved by SAE

Specifications of such properties as viscosity and water tolerance, boiling, flash, cold points, neutrality, stability, rubber swelling and corrosion limitations are established in the first standard for hydraulic brake fluids used in motor vehicles approved recently by Technical Board of the Society of Automotive Engineers. Outgrowth of work initiated in 1936, the standard was prepared by a committee comprised of engineers from the staffs of manufacturers of fluids and covers heavy and moderate duty fluids.

Heavy duty fluids are defined as those for use under severe operating conditions, having a temperature range of minus 40° F to plus 130° F. Moderate duty fluids, for lighter service, are for use from minus 30°F to plus 130° F. A subcommittee is now studying relationships between brake fluids and corrosion of braking system parts.

Axonometric Drawing

(*Concluded from Page* 81)

closely related to what the beholder would see by looking at the object itself at a certain natural angle that everybody can recognize the shape of the pictured object from one-view drawing.

The three-view blue print, however, furnishes three separate views, taken forcedly from three different sides in a way hardly ever used by anybody when looking at an object. Thus the beholder of the three-view drawing has the difficult task of composing in his brain, by imagination, the shape of the pictured object out of the three views shown.

The accompanying drawings illustrate these principles. Fig. 2 shows a regular blue print or three-view drawing of a machine part. The three views are entirely different from each other. Many people, not fully familiar with blue print reading, will have a hard time visualizing the nature and shape of the part. Compare Figs. 1 and 3. Both are axonometric representations of the same object. The former is an isometric, the latter a dimetric drawing. The dimensions are indicated as clearly as they are in the blue print, Fig. 2.

Figs. 2 and 3 also bring out the little, but important, difference in appearance between isometric and dimetric projection. While in isometric the scales used for the verticals and the two horizontals are all equal, in dimetric only the vertical and one horizontal scale are equal, while the scale for the second horizontal is smaller (1:2). Also, the angles between the direction of the straight edge and the representation of horizontals of the object are both 30 degrees in isometrics, but 7.2 degrees and 41.4 degrees, respectively, in dimetric. Correspondingly, the shapes of the ellipses used in isometric are equal in all three faces, but are different in dimetric.

Although no uniform and standardized system of drawing has been accepted yet in the field of technical illustration, among the many known methods of drawing, at least there is an unsettled competition between three-view and one-view representation. Nobody seriously questions the superiority of axonometric drawings over three-view blue prints as far as ease of recognizing or reading is concerned. However, the draftsman will say that it is easier for him to make a three-view drawing than a one-view drawing, particularly a dimetric one.

If it is true that axonometric drawings are better suited for getting the idea and picture into the mind of the beholder of the drawing, then the fact that many draftsmen and designers have not yet adopted the fundamental principle of using axonometric drawings as a rule and three-view drawings only as an exception when necessary, is based solely on an existing lack of instruments that would make axonometric drawing as easy as, or even easier than, three-view blue print drawings.

As a matter of fact, the orthodox three-view drawing method has been and still is being carried out chiefly by means of instruments that permit drawing straight lines at right angles to each other and striking circles. It is obvious that this type of equipment is unsuited for making axonometric drawings where no right angles and no circles are used at all. Without being equipped with a set of special instruments designed for laying out the particular odd angles required in axonometrics for representing right angles of the object, and for drawing ellipses, the draftsman is faced with difficulties.

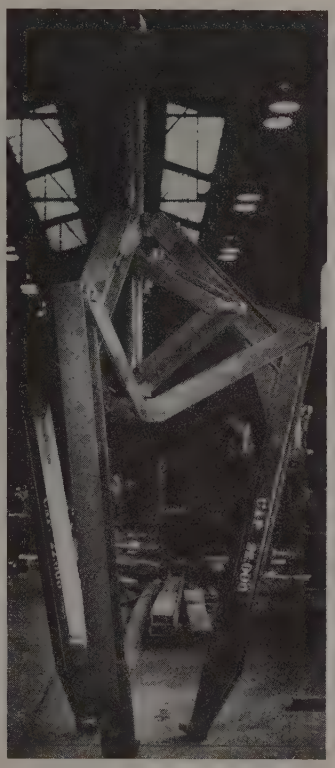
Such special instruments have been developed recently and put on the market. They are of the stencil type, made of clear plastic material, with graduations and lettering debossed and colored. The line of actually available stencils comprises five items: One isometric stencil containing 27 ellipses from 1/8-in. up to 2-in. size and one isometric stencil covering the ellipse range from 1¼ to 4½-in. size, one dimetric stencil with 27 ellipses from 1/8 to 2-in. size, in both projections required in dimetrics; and a pair of dimetric stencils with ellipses from 2¼ to 4½-in. size, one stencil for one projection and the other for the other projection.

A common feature of all these stencils is that they have two graduated edges slanting exactly at the angles required for representing horizontal lines of the object. The third graduated edge runs vertical. In the isometric stencils all three graduations are full scale. In the dimetric ones the vertical edge and one slanted edge have full scale graduations, while the other slanted edge is graduated at half scale. Therefore, there can never be an error in applying the proper scale to the proper axis. Besides, the whole drawing can be made with one instrument of this type, while otherwise one would have to switch continuously from triangle or protractor to rules with full or half scales.

All ellipse openings are so dimensioned and marked that they represent, at full scale, a circle of the corresponding diameter. The center lines are marked at four points of every ellipse line up with the center lines of the drawing laid out parallel with the isometric or dimetric axes. Therefore, locating the ellipses properly is no trouble at all. The ellipse openings are so positioned within the stencil that they automatically assume their correct position in the drawing, if the stencil is placed with its base edge or with its slanted right hand edge against the T-square or straightedge.

These scientifically designed new instruments, called "two-angles and ellipse stencils" and branded Instramaster, remove difficulties that so far hampered the widest possible use of axonometric drawings in industry.

Part drawings in machine shops can hardly be shown better than in a one-view drawing. Doubts about whether a certain shape is a recess or a projection, a hole or a stud, are entirely eliminated. No questioning back and forth between the man at the bench and the foreman, the foreman and the engineer is necessary. Sheet metal work, wooden cabinets, plastic moldings with thin walls are more readily recognized in a one-view drawing than in a set of top, front and end views. Piping systems with intersections and crossings at different levels are almost impossible to show in a three-view drawing, while in a one-view picture their relationship is three-dimensionally clear. The same applies to assemblies of structural iron.



GIANT JAWS: Fifteen feet from hook shackel to hardened lifting lugs, these giant automatic tongs made by Heppenstall Co., Pittsburgh, are used to transport and store 11-ton stacks of locomotive wheel tires ranging in size from 2½ to 7 ft in diameter. Shown here in closed position, the 3485-lb tongs may be extended to handle stacks 6 ft high

Molten iron coming from the iron notch of a blast furnace at the beginning of a cast

In this final article, enrichment of the blast with oxygen as a means of increasing the heat in the hearth and bosh is discussed and the wide difference in the weight of raw materials used in the production of a ton of pig iron is summarized

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

THERMAL REQUIREMENTS for Blast Furnace Operation

DISTRIBUTION of heat in blast furnace operation usually is determined by dividing the consumption between the work performed in the shaft and in the hearth and bosh. The amount of heat consumed in the reduction of the iron from its various stages of existence in the raw materials is always the largest individual item of heat consumption but division of the amount consumed for the purpose in the shaft or bosh operations is a variable. The statement is based upon the results reported by the Burcau of Mines research at a Southern[3] and a Northern[10] furnace operation. From gas analyses determined from samples taken at different planes of the furnace it was indicated that in the Southern furnace 80.5 per cent of the iron oxide reduction took place in the *shaft* of the furnace and 19.5 per cent in the bosh. In similar tests at the Northern furnace it was indicated that only 24.4 per cent of the iron oxide reduction took place in the shaft and 75.6 per cent took place in the *bosh*. In both operations the stage of iron oxidation was largely hematite (Fe_2O_3) and therefore they were comparable in that respect. But they were not comparable in the burden materials used. The character of the raw materials in the southern operation is shown in the data of the South heat balance[3] and that of the northern operation in the data of the North heat balance since the Bureau of Mines northern research work was conducted at the same furnace plant and presumably with the same general class of materials and furnace practice as prevailed when the North heat balance was prepared.

The difference in the North and South percentages of iron oxide reduction in the shaft and bosh indicates that the dimensions of the bosh are a variable determined by the character of the raw materials used. From the premise that the top of the bosh is the plane at which fusion begins it seems logical that the amount of volatile matter to be evolved from the stock before fusion can take place will determine the location of the fusion plane. If, as in southern practice, there is a large amount of stone to be calcined some of the iron oxide could be reduced to the sponge state (without fusion) before the stone was completely calcined and gas samples would indicate the reduction took place in the *shaft* while with the conditions of North gas samples might indicate the reduction took place in the *bosh* when actually the reduction took place in the same relative plane as South.

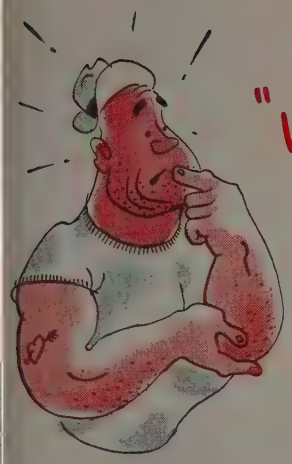
Data of the South research showing the distribution of heat[3] indicate the same amount of heat consumed per lb of oxide whether reduced in the shaft or in the bosh and therefore it appears to be immaterial to the fuel economy of the operation where the reduction takes place. Since the purpose of the operation is to produce iron the important consideration appears to be the consumption of heat for purposes other than iron. To indicate those other purposes the heat distribution data of this comparison of operations have been prepared as in Table XIII.

Comparison of heat requirements for different classes of raw materials which has been presented appears to indicate clearly that the great difference in the fuel rate between the extreme conditions exemplified in South and East lies in the amount of heat consumed by the reactions concerned with gangue removal and not by those concerned with the reduction of iron.

As indicated by the slag data 1 lb of neutral slag in any operation consumes approximately 1.75 times as much heat per lb of slag as the iron which is produced with it and obviously when the maximum benefit to heat consumption has been attained from chemical composition of slag further benefit is possible only from reducing the amount of slag to be produced. It is believed that chemical composition of slag never should be sacrificed to get a lower weight of slag but with chemical composition right an amount of slag greater than that which is needed for sulphur elimination is wasteful of heat.

As indicated by the gas data the lb of gas will determine the amount of heat lost to the furnace with the gas even though the loss per lb is comparable between different furnaces. Since gas is the product of carbon combustion plus the volatile matter of the mix the minimum lb of gas which may be produced

[3] All footnotes are presented at the end of this article.



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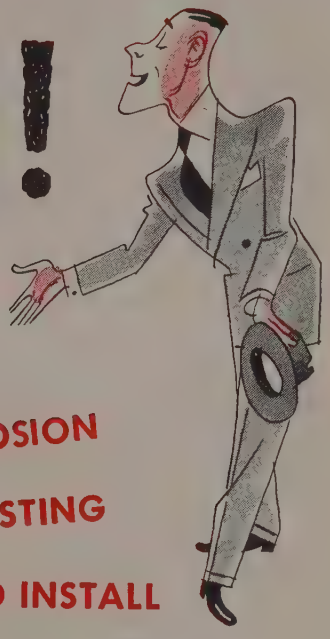

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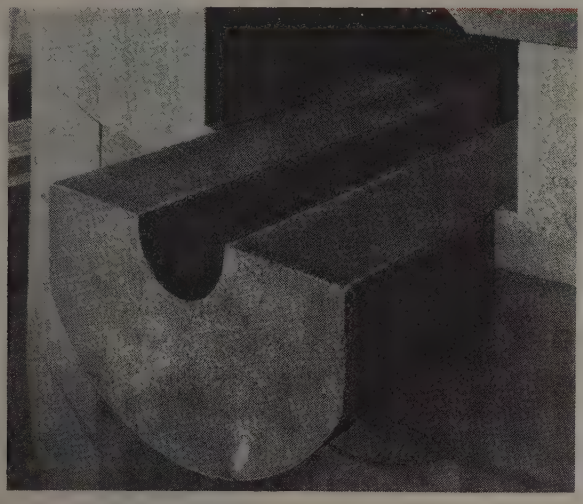

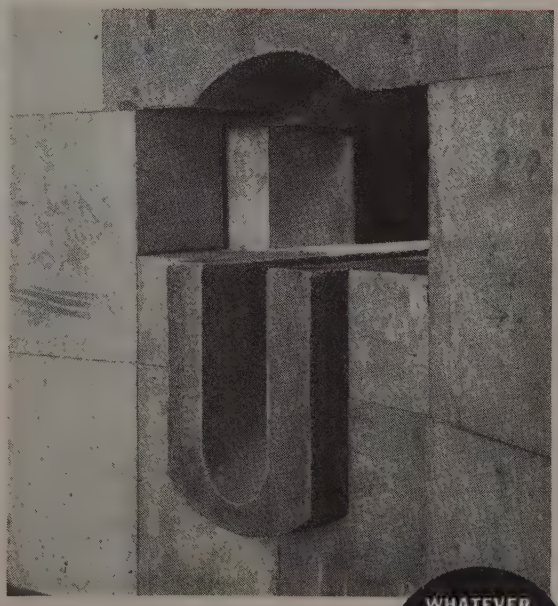

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per lb of iron will be determined by the lb of carbon which must be burned to produce the amount of heat required. It follows that the only way in which the lb of gas can be reduced is to lessen the amount of work to be done or to produce the required amount of heat with less products of combustion. The first can be accomplished by concentration of iron in the raw materials (example East) and the second by enriching the blast with oxygen.

The natural ores of East, before concentration, were leaner than those of South but with proper preparation and with *furnace practice* adjusted to the raw material needs the reduction of 48.6 per cent in the fuel rate compared to South is indicated.

As yet no economical method has been developed for increasing the oxygen content of the blast, but assuming that it could be done the value of its use for lean ore operation (example South) is open to question because the ratio of work to be done between the iron and the gangue would be only slightly changed and the possible savings in fuel to reduced weight of gas alone does not appear to be sufficient to justify any great expenditure of capital for oxygen enrichment. But the enrichment of the blast of a fully beneficiated ore operation presents an attractive picture.

Comparative data of heat distribution indicate that South consumes over three times as much heat per ton of iron for the removal of volatile gangue as East. Discounting the dissociation of moisture, which is largely in the hearth, South still consumes 307.4 per cent more heat for volatile gangue removal than East and such consumption is entirely in the shaft operation of the furnace. Data of flue dust production show that per ton of iron South produces 308.8 per cent as much dust as East. Burden ratios of South are less than East. Blast temperature of South is only 61.7 per cent of East. All of this evidence indicates that the South shaft operation is working at capacity and that the hearth and bosh is not. The same data indicate that in East, through concentration of iron in the raw materials, the shaft work has been greatly reduced and more work has been put on the bosh and hearth. The conclusion to draw from the comparison appears to be that productive capacity of the South operation is limited by the capacity of the shaft to prepare stock for smelting in the bosh and hearth, and that the productive capacity of East is limited by the amount of heat which can be delivered to the hearth and bosh.

Enrichment of the blast with oxygen would increase the production of heat in the hearth. From the evidence presented South has a surplus of heat in the hearth and with the shaft operation working at capacity no additional burden could be added to consume the additional heat made available from the oxygen enrichment and therefore it could not be utilized and would not have value. The only opportunity for benefit appears to be in producing the same amount of heat with less blast and thus reduce the amount of heat taken from the furnace by the gas. In East however additional hearth heat made available by oxygen enrichment of the blast could be utilized by increasing the burden of iron-rich volatile-free materials because such materials do not materially increase the work of the shaft. Conditions are shown in Table XIV.

Assuming that the South blast weight was reduced to that of North and enriched with oxygen to the 33.3 per cent content instead of the natural 23.0 per cent then the same amount of heat (14,472,935 Btu) could be generated with 30.7 per cent less weight of blast (ignoring slight difference in atomic weights of oxygen, 16.0, and nitrogen, 14.01) and the weight of the South gas would be reduced in the same proportion. The heat carried from the furnace by the gas, plus the moisture in the gas, is:

Operation	Btu
South	1,735,469
North	1,452,500
	282,969

This indicates a reduction in the heat requirements (14,472,935 — 282,969) to 14,189,966 Btu which is equivalent to only 1.9 per cent.

Assuming that the East blast weight could be enriched with oxygen to the 33.7 per cent content instead of the natural 23.0 per cent then the amount of heat generated would be equal to that of North without any greater drainage of heat from the furnace by the gas since the gas weight would remain the same. The gain in heat to the hearth and bosh operation therefore would be:

Operation	Btu
North	12,848,000
East	10,554,496
	2,293,504 or 21.7%

Conclusion: In a series of articles[5] dealing with the subject of iron ore beneficiation and the use of such materials in the blast furnace burden, emphasis was placed on the fundamental principles involved, with minimum reference to specific operations. The present article, being a comparison of data recorded from specific operations, is an attempt to show the application of the fundamental principles to actual operation. Recorded data used for the comparison were compiled by different authors over a period of 31 years from furnace operations of different size using a wide range of materials and is therefore broad in scope.

As further support of the reasoning on principles reference is made to the excellent factual data recorded by Dobscha[11] in a furnace test conducted with two identical furnaces for the sole purpose of determining the advantage to operating economy from using a prepared ore burden compared to a natural ore burden. These data sustain the discussion of principles the same as the data from the three furnace operations compared in the present article.

In a circular entitled "Sinter and the Blowing Rate" prepared by the author and mailed throughout the trade in 1942 it was said in part;

"The introduction of a small percentage of sinter into a soft ore mix will open up the mix and may even permit harder blowing than with the soft ore alone because of better distribution of gas, and such benefit is progressively greater until the percentage of sinter reaches the critical point where the stock column becomes too open and there is not enough soft ore to absorb the excess heat produced. When that critical point is passed the heat production rate must be adjusted or the benefits from the sinter will be lost, but when adjusted the benefits to the over-all economy of the operation are greater than with a partial sinter mix."

In the series of published articles[5] frequent reference has been made to the advantage to gas and heat distribution through the stock column in the furnace

TABLE XIII—DATA ON CONSUMPTION OF HEAT

Per gross ton iron	South Btu	South %	North Btu	North %	East Btu	East %
Heat produced:						
All sources	14,472,935	100.00	12,848,000	100.00	10,554,496	100.00
Heat consumed:						
Volatile gangue,						
Calcination of carbonates	1,176,470	8.10	702,000	5.50	247,050	2.33
Dissociation of moisture	1,030,464	7.20	397,000	3.10	274,176	2.59
Carried off: by gas (dry)	1,083,650	7.50	752,400	5.90	574,692	5.44
Carried off: by gas moisture	651,819	4.50	700,100	5.40	125,427	1.19
	3,942,403	27.30	2,551,500	19.90	1,221,345	11.55
Nonvolatile gangue, carried off by slag	1,500,632	10.40	909,000	7.10	797,424	7.57
Total consumed by gangue	5,443,035	37.70	3,460,500	27.00	2,018,769	19.12
Reduction of iron	5,577,086	38.40	6,623,300	51.50	5,358,917	50.78
Reduction of MnO, P_2O_5, SiO_2	825,832	5.70	483,900	3.80	492,637	4.67
Carried off by iron	1,086,400	7.50	1,142,500	8.90	1,146,880	10.87
Total consumed by iron	7,489,318	51.60	8,249,700	64.20	6,998,434	66.32
Radiation, cooling water, and unaccounted for	1,540,582	10.70	1,137,800	8.80	1,537,293	14.56
Total heat consumed	14,472,935	100.00	12,848,000	100.00	10,554,496	100.00

shaft gained from the introduction of a small percentage of sinter into the burden. The benefits are largely mechanical and are progressively greater until the critical condition of maximum gas-solid contact is reached.

The principle cited is supported in Dobscha's paper by his comments and the factual data. With the introduction of 21.3 per cent of volatile-free nodules into his burden of prepared materials he was able to blow 2.1 per cent more air per min than with the natural ore burden. He expressed the belief that more air could have been blown had adequate equipment been available. Possibly this could have been done but to what extent is a matter of conjecture.

It seems reasonable to say the critical condition of maximum gas-solid contact and the heat absorption rate of raw materials varies with the physical and chemical characteristics of the materials. With the introduction of the nodules into the burden Dobscha found it necessary to make adjustments in the filling before "a suitable blowing rate" could be established, and the difficulties encountered were more pronounced "at higher wind rates." This evidence indicates that the critical condition was being approached and supports the principle that there is a critical condition beyond which economical operation is not possible. The principle is not new since the same condition has long been recognized in all natural ore operations but it is believed that effects are eccentuated with the introduction of volatile-free materials into the burden.

Further evidence of support to the principle involved is found in the questionnaire circulated by the Blast Furnace Technical Committee of the American Iron and Steel Institute in which replies to the question of the preferred percentage of sinter in the burden varied from 0.0 to 100.0 per cent.

In the published discussion of principles emphasis has been placed upon the importance to fuel economy of the efficiency with which the heat generated is used rather than upon the amount of heat generated. The degree of efficiency of use is contingent upon the percentage of the generated heat which is *recovered*.

The comparison of the heat requirements for various materials, presented in this article, indicates that the per lb requirements for iron and slag of similiar chemical composition will be the same in any furnace operation.

Composition of the iron and slag from the natural and prepared ore burdens described in Dobscha's paper are virtually the same and therefore the amount of heat required per lb of the respective products would be the same. Data of the paper show that a lower hot blast temperature and less water on the stock at the top of the furnace were used with the prepared ore burden than with the natural ore burden. Also an increase in production with a reduced fuel rate was noted. The enriched iron content of the prepared ore burden accounts for the increase in production and a lower weight of slag per ton of iron. As shown in the comparative slag data of this article each lb reduction of slag weight would make available enough heat to take care of 1.75 lb of additional iron.

Top gas analysis of the prepared ore burden shows an increase of 0.9 per cent in the weight of net CO_2 which generated heat within the furnace compared to the natural ore burden.

Reduction of 27.0 per cent in the amount of water used at the top of the furnace to control top temperature indicates that a lessened amount of heat was carried from the shaft by the rising gas column and that the cause of the reduction was the more efficient *recovery* of the more evenly distributed heat through the stock column of the furnace shaft caused by the presence of the granular, volatile-free materials of the burden. The *recovered* heat would be returned to the hearth and bosh by the descending stock column.

The combination of greater production of heat from the CO to CO_2 reaction, more efficient recovery of heat in the furnace shaft, and less consumption of heat by slag in the hearth and bosh, permitted the heat balance between the work of the shaft and of the hearth and bosh to be maintained with a slight reduction in blast temperature from that used with the natural ore burden.

The cause of the difficulty encountered in the attempts to use higher blast temperature does not appear to be any different than in any other blast furnace operation. In the discussion of principles the *importance* and *necessity* of maintaining the proper heat balance between the work of the shaft and of the hearth and bosh has been stressed.

Data of the three furnace operations compared in this article indicate that increased percentages in the burden of materials of a character which cause a greater weight of material to be delivered to the hearth and bosh (materials which increase the preparation capacity of the shaft) create the demand for more heat in the hearth and bosh and higher blast temperature is needed.

The same influence upon fuel economy of the total weight of raw materials required to produce a ton of iron is indicated in the comparison of Dobscha's data as is indicated in the three-furnace comparison of this article. The three-furnace comparison shown earlier in this article is on a gross ton basis (2240 lb) while the Dobscha data shown in Table XV is on a net ton basis.

The data of this article have been presented to illustrate and amplify various phases of the heat requirements of the blast furnace operation. It has covered many pages but so far as the *cause* of the various fuel rates is concerned it is believed the story was told in the first section of the comparative data which show the wide difference in the *weights of materials* needed to produce an equal weight of 1 ton of pig iron.

TABLE XIV—OXYGEN ENRICHMENT OF THREE OPERATIONS

	South	North	East
Blast:			
Weight (dry), lb	9627.88	6673.00	4548.00
Per cent of South		69.30	47.20
Per cent of North			68.10
Oxygen, lb, @ 23% O in air	2224.02	1534.79	1046.04
To generate same amount of heat as South, blast of North and East would have to contain same lb O as South		2224.02	2224.02
Which in percentage of blast weight is		33.30	48.80
To generate same amount of heat as North, East would have to contain same lb O as North			1534.79
Which in percentage of blast weight is			33.70

TABLE XV—WEIGHT OF MATERIALS TO PRODUCE 1 NET TON (2000 LB) OF IRON

	Burden		Difference	
	Natural ore, lb	Prepared ore, lb	lb	%
Total iron bearing materials	4,091	3,725	— 366	—08.9
Coke	1,766	1,624	— 142	—08.0
Stone	790	632	— 158	—20.0
Blast (cu ft × 0.080728)	7,232	6,449	— 783	—10.8
Moisture	174	137	— 37	—27.0
	14,053	12,567	—1486	—10.6

(9) *Technical Paper, No.* 391, Bureau of Mines by S. P. Kinney, P. H. Royster and T. L. Joseph.

(10) "Principles of Iron Ore Beneficiation", *STEEL*, Nov. 26, Dec. 3, 10 and 17, 1945, by C. E. Agnew.

(10) "The Blast Furnace Stock Column", *Technical Paper No.* 442, Bureau of Mines, by S. P. Kinney.

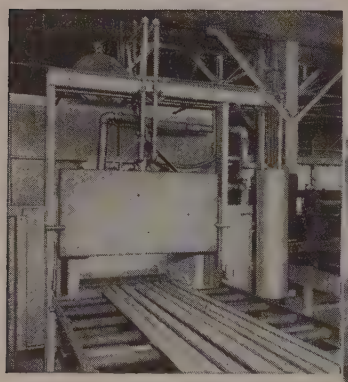
(11) "Affect of Sized and Nodulized Mesabi Iron Ores on Blast Furnace Performance", *American Iron and Steel Institute*, May 23, 1946.

—o—

An electrode selection chart which specifies the electrode to use, the proper current, and the mechanical properties has been published and is available from Air Reduction Sales Co., 60 East 42nd street, New York.

GASMACO INDUSTRIAL FURNACES

OIL or GAS FIRED

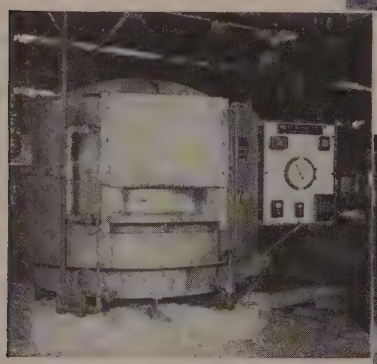


ROLLER HEARTHS

DRUM TYPE ROTARIES

DOUGHNUT TYPE ROTARIES

CAR TYPE FURNACES



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CLEVELAND 10, OHIO

Hydraulic Crane Reduces Steel Erection Time

Features of a 2-ton capacity Hydrocrane manufactured by Milwaukee Hydraulics Corp., Milwaukee, enabled the Lafayette Steel Co. of Chicago to set steel trusses and beams for a reinforced concrete second floor structure in 1½ days, using only five men on the job. Originally, it was estimated that the job would take 12 men 10 days using a pole, block and tackle.

The crane, which embodies a 30-ft boom that telescopes hydraulically to 22 ft and which may be lowered to 7 ft horizontally, was hoisted to the second floor by a ½-cu yd truck crane after having been used to hoist the trusses from the ground onto the roof. Original lift of the crane, which was mounted on a truck chassis, was accomplished in 28 min, removal being effected in 15 min after knowledge of sling location had been attained.

Trusses weighed two tons and the beams about 1100 lb. The crane positioned on the roof lifted the beams from the trucks as they were delivered. Each load was raised and lowered hydraulically and closely controlled, thereby reducing the time-consuming "jockeying" around for position, the company reported.

Educational Movies Cover Broaching Technique

Various phases of broaching and broaching techniques are covered in three 16 mm sound motion picture films recently offered by Broaching Tool Institute, New York. Produced during the war by the United States Office of Education, the training films were released to the Institute for showing to technical society meetings and in technical schools.

Titles of the three films are: "Broaching an Internal Keyway", "Single Ram Vertical Surface Broaching" and "Double Ram Vertical Surface Broaching." All three are stated of value in training operators, setup men and tool designers, as well as increasing efficiency on broaching operations.

—o—

National Bureau of Standards announces a revision of simplified practice recommendation R17-43 for heavy forged hand tools has been proposed. The standing committee in charge of recommendation has approved the proposed revision for comment, acceptance or both. Revision now proposed will modernize recommendation for peacetime conditions. Copies may be obtained from Division of Simplified Practice, National Bureau of Standard, Washington.

Steel is not going to be short forever. Someday you'll be able to get all you want of what you want . . . and at Wolff Steel Service that means the whole range of sheets, bars, structurals, copper and tin plate. Even more, it means a faster start in getting deliveries . . . . for Wolff has built a reputation for cutting routine and red tape when it comes to moving steel for production schedules. During the entire "famine period", 100% of their 1940-41 purchases were delivered to old accounts to help customers keep their work going on a planned basis. If you can use an alert and loyal warehouse service to advantage, you'll find Wolff Service ready to work with you on the move for steel. Call or write.

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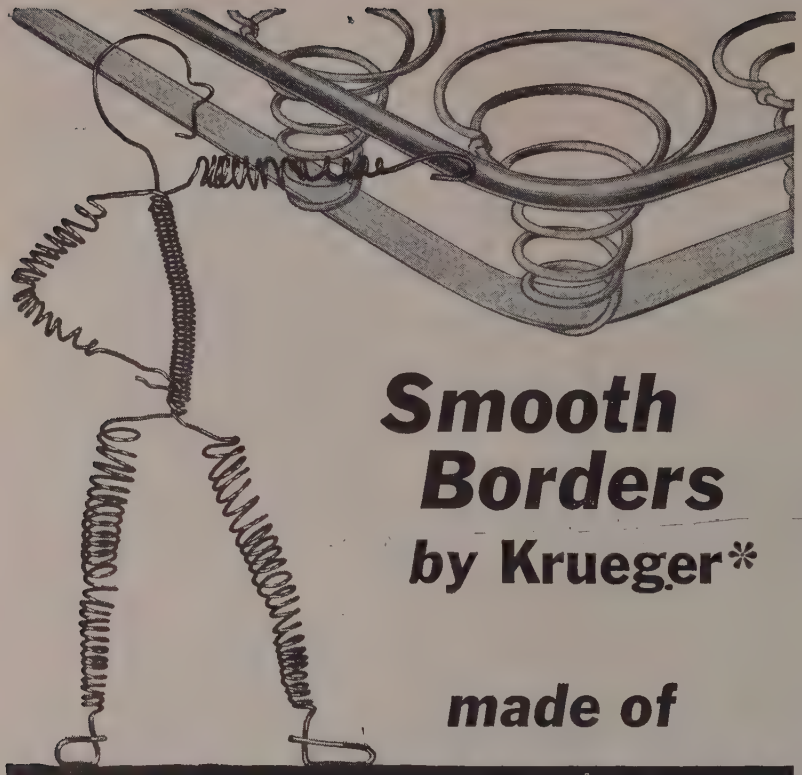
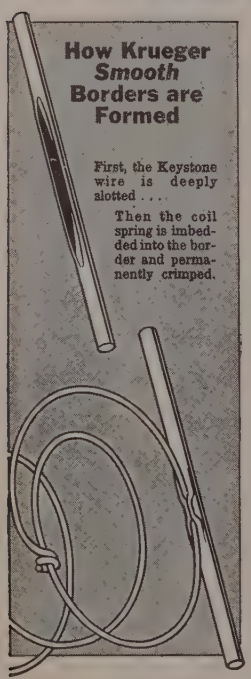


Smooth Borders by Krueger* made of

KEYSTONE WIRE


How Krueger Smooth Borders are Formed
First, the Keystone wire is deeply slotted . . .
Then the coil spring is imbedded into the border and permanently crimped.

If you've ever bumped your tender portions against the rough edge of a bed spring, you can fully appreciate the comfort-feature of Krueger smooth borders. Non-sag support and longer spring life are other reasons why more and more spring manufacturers are specifying Krueger. Into Krueger borders go dependable Keystone wire . . . with proper ductility for easy forming and crimping — yet stiff and springy to resist sagging.

Whatever the wire need, Keystone can normally supply it.

*Krueger and Company, Chicago 47, Illinois

KEYSTONE MUSIC SPRING WIRE

SPECIAL ANALYSIS WIRE for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

30-Inch Pipeline

(*Concluded from Page 75*)

of about 5200 psi applied inside.

Purposes of the expansion are first, cold-working of the metal through stretching to increase its yield strength, thus permitting thinner walls for given pressures. (Gas pressures will reach their maximum at about 800 psi). Second, expansion against cylindrical dies gives utmost roundness and straightness. Third, stretching metal at its minimum yield strength also tests the welded seam. Expansion of the pipe shortens the 30-ft sections by several inches.

From the expanders the sections are end-welded by twos circumferentially, Fig. 5, to make 60-ft shipping sections. Final operations are sand blasting, priming, coal-tar coating and wrapping with asbestos felt.

The line will be installed by H. C. Price Co., Los Angeles and Bartlesville, Okla., for Southern California and Southern Counties Gas Cos. In general orthodox methods will be used in the installation. Prior to hauling and stringing, light grading will be done with RD-8 cats and bulldozers. Cats with side arms are to be used in unloading trucks. Ditching will be done by trenchers with 42-in. width and 8 ft depth capacity.

Pipe will be welded in the field with shielded arc machines. X-ray examinations of one weld in ten will be made as field tests. Rivers, including the Colorado, San Pedro and Pecos, are to be spanned by suspension crossings.

Ultimate capacity of the line will be 305 million cu ft per day. Weight of this much gas is 7625 tons.

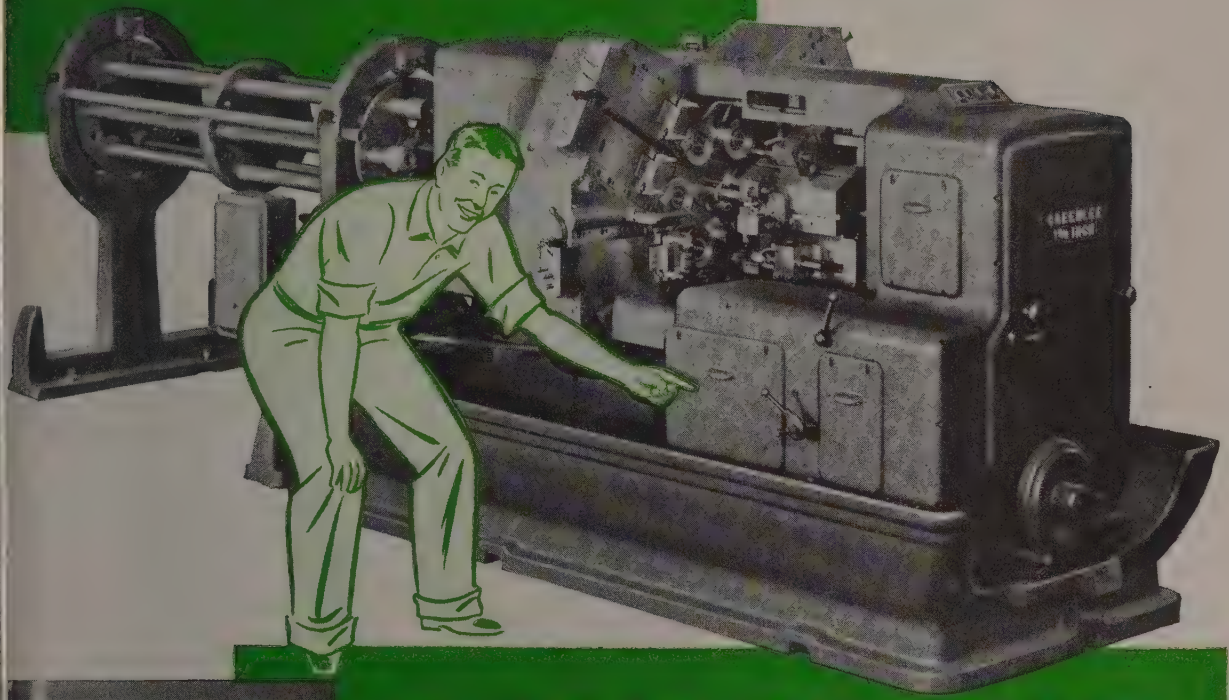
Silcones Seeing Wide Use In Electrical Apparatus

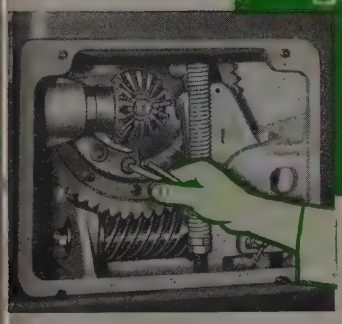
High-temperature varnish for motor windings is probably the best known use of silicones, although they are infiltrating into many types of electrical apparatus. In tests conducted by Westinghouse and Dow Corning, a railway motor was found to have windings in excellent condition after 1700 hours of operation at 500° F, including 46 high-humidification cycles. While as yet the costs of silicon varnishes preclude their wholesale use on rotating machines, they have demonstrated their superiorities in operation under these adverse conditions.

Gasketing material of silicone rubber also proved an excellent cover seal for searchlights, Westinghouse states, being able to resist the high temperatures created by the electric arc. Such uses, along with others in magnet coils, and transformers, are increasing the prestige of this product of expanding uses.

SAVE TIME WITH THE GREENLEE "6"

AUTOMATIC SCREW MACHINE





Here is a close-up showing how the main tool slide stroke is set by an adjustable dog on the worm wheel.

NO CAMS FOR MAIN TOOL SLIDE. YOU CAN RESET THE STROKE IN LESS THAN 5 MINUTES...

EASY TO GET AT. Main tool slide setting on the GREENLEE "6" is unique in its simplicity, accuracy, and speed of adjustment. Instead of the conventional barrel cam or similar arrangement, the GREENLEE has a worm and worm wheel drive to a special rack and pinion mechanism. The length of the feed stroke is controlled by a single adjustable dog on the worm wheel. By simply removing a cover plate and resetting this dog on a graduated scale . . . the work of only a few minutes . . . the point where cutting feed starts can be quickly and accurately set. This important GREENLEE feature goes a long way to reduce set-up time between jobs. Note also the many other distinctive features which make the GREENLEE "6" the Operator's Favorite.

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- Standard interchangeable cross-slide cams.
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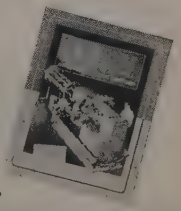

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MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

Welded Motors

(*Concluded from Page* 81)

fixture and placed on a similar but somewhat simpler fixture for machining the bracket fits. This fixture has a pilot fit which engages the center of the boring mill table and insures accurate concentricity between the inner diameter of the stator punchings and the bracket fit. With the small air-gaps required in squirrel-cage motors such attention to concentricity of parts is essential.

For certain sizes and speeds of motors a fabricated steel spider is used. This is built up from simple flame-cut rings of heavy plate and lengths of bar stock. Rotor clamping plates are flame-cut and welded in place on the spider. Phos-copper welding is used to join the rotor bars and end-rings.

The final result is a motor which can be adapted to the various requirements of the industrial field with a minimum of engineering and tooling changes. It has adequate enclosures, is light weight but rigid and has the clean lines and smooth appearance which is characteristic of modern machinery design.

Machining Movie Offered

Methods of reducing work handling in mass producing peacetime products are demonstrated in the movie available from Greenlee Bros. & Co., Rockford, Ill., showing its 24-station automatic transfer machine at work. The 12-min, 16 mm sound film gives cycle time and other interesting production facts about the operation filmed, processing of refrigerator compressor housing. It also depicts the 31 different machining operations performed by the 98½-ft machine.

Demand Increasing for Quality Measuring Devices

Real demand in measurement leading to automatic control is for devices which more nearly measure the quality of a process. So states H. D. Middel, an engineer with General Electric Co., Schenectady, N. Y., in a paper discussing trends in industrial instrumentation as influenced by electronics. Qualitative measurements are difficult, if not impossible to obtain, he says. Although truly qualitative measurements may not be a reality for the majority of processes and materials dealt with in industry for some time, he believes that it is in this direction that electronic instruments have their greatest influence.

Looking into the future, the engineer forecasts small instrument boards suitable for mounting on a table top before a single operator and utilizing miniature instruments instead of large supervisory instrument control boards requiring entire buildings for their housing. The place of the conventional wide chart or round chart paper type recorder may be taken by wire recorders with audio-tone signals whose frequency is a measure of deviation. He also looks for high accuracy indication, clock hand type motor driven servo instruments with a 100 in. effective scale length in a 4 in. instrument case and having a full scale time of 5 sec.

Stainless Used for Heater Combustion Chamber

Life expectancy of commercial and industrial direct fired heaters is expected to be greatly increased because of the high resistance to oxidation of stainless steel used in the combustion chambers of the units made by Dravo Corp., Pittsburgh. This is believed to be the first time this material has been incorporated in commercial and industrial space heaters.

Vulnerable part of an air heater is the combustion chamber where oxidation from high temperatures may cause inefficiency and failure. According to the company, use of heat resisting stainless steel will not only prolong its useful life, but will aid in maintaining high efficiency of the industrial and commercial heaters.

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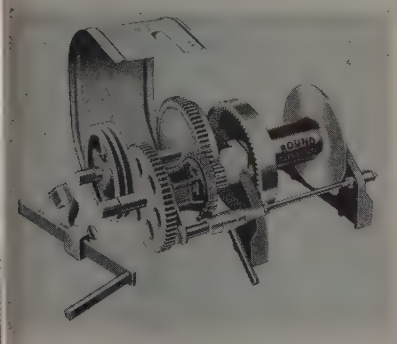
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 118

1. Power Winch

Five-ton, No. 102 power winch, announced by David Round & Son, Cleveland, is fitted with a V-belt pulley and connected to a 2-hp reversible type motor. It is intended for general industrial and construction use, and as a car puller for spotting railway cars.

Winch is equipped with an automatic friction disk-type brake which provides necessary safety and control for lowering



and suspension of load. Pawl may be lifted from ratchet by means of counterweighted lever releasing friction brake and permitting cable to be run out as rapidly as desired. Crank is supplied with winch for use in case of power failure.

2. Contour Sander

Irregular surfaces or edges are finished and sanded by a contour sander introduced recently by Sand-O-Flex Corp., 4373 Melrose avenue, Los Angeles 27.

Known as model 650C, it may be used on any rotating shaft.

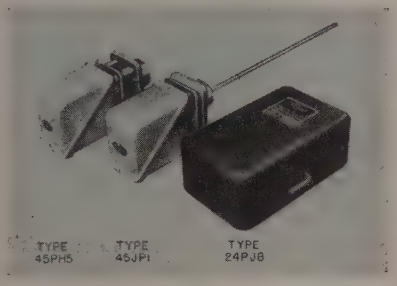
Tool is equipped with 12 brush-backed abrasive strips. These are fed out as needed from an internal cartridge. As the tool is rotated, the strips are forced into, around and over any surface or contour. Fast action of the tool allows it to be used for sanding and finishing operations, for "satin" finishing and for removing rust, scale, tool marks and for deglossing.

Sander has a 6⅝-in. housing, and 10¾-in. overall diameter including height of brushes. The abrasive strips are 2½-in. wide, and are made in various grits and grades, scored or unscored, in aluminum oxide and garnet cloth. Fully loaded the tool weighs 7½-lb.

3. Flame Failure Safeguard

Photoelectric device is used by a new Fireye flame failure safeguard developed by Combustion Control Corp., 77 Broadway, Cambridge 42, Mass., to guard against explosions caused by flame failure in industrial oil burner installations.

Equipment consists of photoelectric scanner type 45PH5 for monitoring the



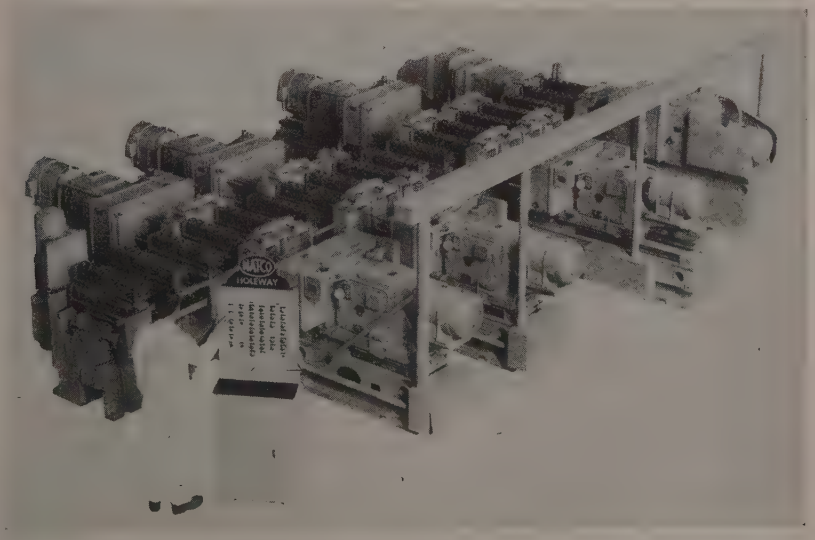
main oil burner flame and control type 24PJ8 for programming the oil pump, oil valve and ignition system. Flame rod type 45JP1 may be added to this combination to monitor the gas pilot flame as well.

Scanner is compact and readily installed on the burner plate either at the time of assembly of the original burner equipment or upon installation in the field. The programming control provides accurate setting of oil valve delay and post ignition periods in seconds upon installation. Timing is accomplished through a synchronous motor. Relay contacts are capable of handling a pump motor of 1 hp rating. Device operates on 115 or 230 v, 60 cycle ac.

4. Hole Processing Machine

National Automatic Tool Co. Inc., Richmond, Ind. announces an automatic processing machine capable of producing 90 engine blocks per hour. It includes 19 stations and is arranged to complete the following operations: Drills 23 holes ranging from $\frac{3}{16}$ to ½-in.; combination drills and countersinks one $\frac{7}{16}$-in. hole; countersinks 14 holes ranging from $\frac{3}{16}$ to ½-in.; taps 15 holes ranging from ⅜ to $\frac{7}{16}$-in. tap; drills $\frac{13}{32}$-in. diameter oil gallery hole clear through engine block in 12 successive steps; taps oil gallery both end ⅜-in. pipe tap.

In completing the operations the machine provides automatic control necessitating one operator. It automatically advances the engine blocks from station to station, clamps and unclamps them in each position, and synchronously performs the operations at all stations as the blocks travel through the machine. The



blocks are then automatically ejected onto a roller conveyor.

5. Hydraulic Work Stand

Aerostands, hydraulically operated adjustable work stands of the type used in wartime aviation applications, are being manufactured by Airquipment Co., Burbank, Calif. A 16 sq ft work platform with a maximum static load capacity of 1500 lb may be hydraulically

elevated or lowered to any working level from 3 to 24 ft, depending upon the individual model. Units feature automatic and self-adjusting steps which maintain their position parallel to the ground regardless of working angle.

All models are equipped with guard rails and skid proof surfaces on platforms and steps. Frames are constructed of welded tubular steel mounted on swivel casters with caster locks. Truck locks hold stands stationary when in service. Tow bars, scaffold strips, stand extensions and hoist attachments are optional equipment.

6. Flexible Gas Tubing

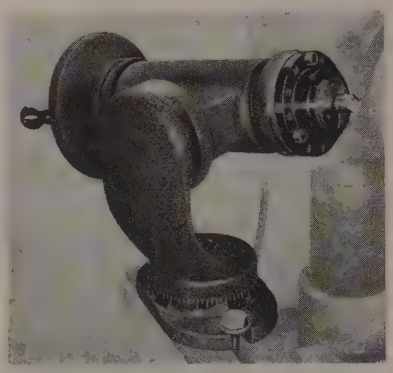
A new AGA flexible gas tubing, called Carbo-Flex, developed by Carbo-Flex Hose Co., 5452 Vineland avenue, North Holywood, Calif., may be connected or disconnected in an instant. Equipped with a Wiggins quick coupling at either or both ends it is connected or disconnected by a quick push or pull. Made in 1/2 and 3/4-in. sizes for gas it is suitable for use in testing laboratories of portable space heaters, floor furnaces, and other types of equipment, portable or stationary.

Tubing is offered in standard lengths of 1 to 6 ft, and in other lengths on order. It also is available in sizes 1/4, 3/8, 1/2, 5/8, 3/4, 1 and 1 1/4 in. for use other than gas. When of copper or aluminum, it withstands up to 500 lb hydraulic and air pressure. When of stainless steel, galvanized steel, brass, etc., it withstands up to 1200 lb.

7. Grinder Fixture

Accurate Machine Products Co., 1640 South Hobart boulevard, Los Angeles 6, is offering a new model 100-B relief grinder fixture that handles countersinks of all types, center drills, integral pilot cutters and pilot drills, either right or left hand. It also may be used when grinding small tool cutters, sharpening end mills, spot facers and small milling cutters.

Mounting knee of the fixture is designed so its working head can be set in



any position, presenting correct rake or clearance angles to the work. Built-in indexing pins are included in the head.

Fixture fits any standard grinder and handles work from 1/8 to 1 in. diameter with standard collets. Lift of its cam is variable from 0.001 to 1/8-in. Adjustment pins are provided for 1, 2, 3, 4 and 6-fluted cutter grinding.

8. Mine Locomotive

New 25-ton, 480-hp high speed electric mine locomotive designed especially for heavy, fast hauling over long runs is announced by General Electric Co., Schenectady, N. Y. It is of all welded

steel construction and its top maximum speed is 40 mph.

Locomotive is provided with 2-axle swivel trucks giving four-axle distribution of locomotive weight to reduce load and lateral force. The short rigid-wheelbase trucks, with low inertia and swivel connection to the frame, allow free wheel tracking, and minimize binding and strain on both locomotive and rails.

Each axle is driven by a 120-hp, 250-v traction motor. Sparkless commutation over the entire range of load conditions assures long brush life and low commutator maintenance. At the continuous rating of the traction motors, the locomotive develops 12,500 lb tractive effort equivalent to 25 per cent adhesion. Rated drawbar pull is 12,500 lb at a speed of 11.5 mph.

9. Deburring Barrels

Almco Inc., 231 East Clark street, Albert Lea, Minn., announces a line of 11 octagonal deburring and finishing barrels of 30 in. diameter and 32 to 60 in. length, with nine standard compartment sizes from 12 to 60 in. length.

Barrels are furnished either plain or with full neoprene lining and are motor-

driven at 10, 15, 20 or 30 rpm through a speed reducer and 4-step V-belt pulleys, a lever-operated belt release mechanism permitting quick selection of the desired speed. Rotation in both directions is controlled by a start-stop lever which applies a hydraulic brake when in "stop" position.

Clamping lever permits compartment door to be cracked open for draining before unloading. All doors have a watertight sponge rubber seal, with a take-up adjustment to compensate for eventual compression of the seal. Barrels are mounted in a welded tubular steel frame.

10. Surface Finish Standard Set

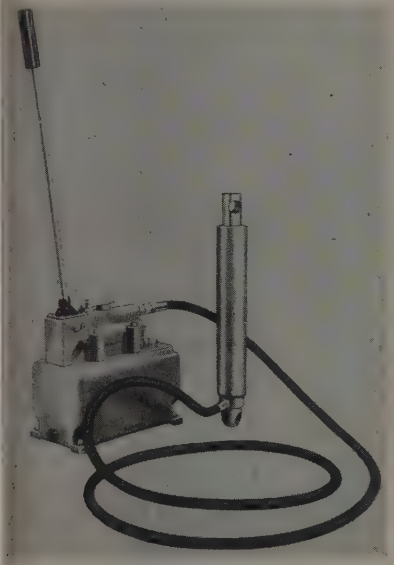
Convenient, quick and accurate on-the-job comparison of surface roughness is provided by a new surface finish standard set, made by University Machine Co., and handled through Edward Blake Co., 634 Commonwealth avenue, Newton Centre 59, Mass. Original machine samples are used by the set to insure accurate comparisons. An operator or inspector simply runs his fingernail over

the sample, then the work, and he knows instantly if the finish tolerance is correct.

Each set consists of 20 small stainless steel original machine-cut specimens, ranging from 2 to 500 mu in. in surface roughness. Polished, ground, shaped, milled and turned specimens are included. Each is individually marked with its roughness value.

11. Hydraulic Hand Pump

An aluminum housed, hand operated hydraulic pump is announced by Industrial Hydraulics Corp., 33 Stage avenue, Painesville, O. Both pump housing and reservoir, which is of 1 gal capacity, are cast aluminum which substantially re-



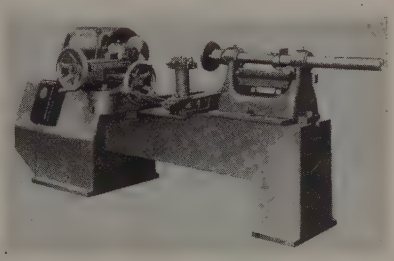
duces weight of entire unit. Pump is available in plunger sizes of ½, ¾ and $\frac{5}{8}$-in. diameter, and is designed for two-way action. Simple linkage reduces friction and increases efficiency of operation.

Unit is manufactured in two models—model PH3A which incorporates a 1 gal reservoir, and model PH4 consisting of pump assembly only, which is adaptable to applications where it is desirable to mount the reservoir at a remote point.

12. Spinning Lathe

Development of a new second-operation spinning lathe by E. W. Bliss Co., Detroit 2, supplements the toggle press by accomplishing secondary spinning operations on products previously drawn in presses, and at a rate commensurate with the primary operation.

Features of the machine include a welded steel frame that makes it possible to install an enclosed, V-belted motor drive and gear box, without increasing weight; combination multiple-disk friction clutch and brake that insures instant stopping and starting; and a fast acting tail-stock toggle clamp that permits rapid loading and unloading of the machine. Because of the tail-stock's offset adjustment, inside form rolls can be used on the machine. Lateral and longitudinal



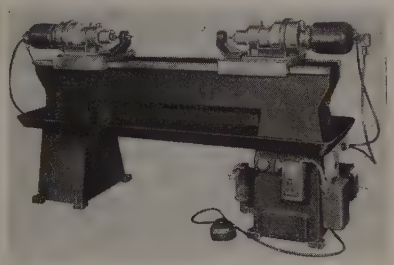
handwheel control of compound rest provides maximum rigidity for frictionless spinning and burnishing tools, and minimizes the manual dexterity necessary for consistent, long-run production.

Lathe is offered in two sizes, with up to 30 in. swing and 92 in. bed length. Both sizes have instantly variable headstock speeds: Model 15 at 275, 365, 615 and 1140 rpm; model 16 at 130, 370, 675, and 1140 rpm.

13. Centering Machine

Robotrill automatic cycle centering machine and drilling heads, developed by Klatt & Wood Co., 329 20th street, Toledo, O., reduce human margin of error by more robot-like control of centering and drilling.

Centering machine, using either general or special work fixtures, centers pieces



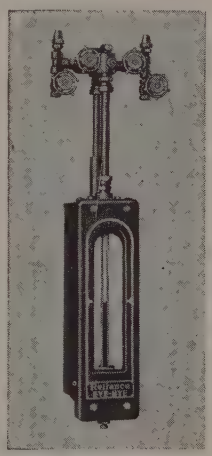
up to 36 in. or longer, with precision accuracy. It also may be adapted for 2-way drilling. Drilling heads control drilling operations so that precise, clean-bottom drill holes occur with every drilling. This is possible through micrometer adjustment of the spindle, depth control to within 0.002-in., even pressure on the spindle during the work stroke by centrifugal force of positive driven balls, and release of the drill spindle without shock.

Heads operate in any position or angle. They may be installed in any special machine where standard mounting brackets cannot be used, and also on automatic screw machines for drilling across holes in parts being machined. In construction, they are self-contained units, using standard motors and ball bearings. Heads are reputed to eliminate tool breakage by 50 per cent.

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 118.

14. Liquid Level Indicator

Reliance Gauge Column Co., Cleveland, is manufacturing an Eye-Hye remote reading liquid level indicator which uses a plastic diffusing screen to improve



the distribution of interior illumination. The case is drip-proof, and arrangement of interior is more accessible for cleaning and renewing of illuminating lamp than previous models.

15. Low Power Motor

Built-in gear train and adaptability for various voltages are features of a model 300 motor built by Electric Motor Corp., Division of Howard Industries, Racine, Wis. A 2-pole shaded pole and brushless unit that offers no radio interference, it provides a maximum speed of 650 rpm, which the built-in gear train reduces to a minimum speed of approximately 1 rpm. Shaft dimensions are changed in accordance with the requirements specified, and windings may be included for operation on 115, 60, 45, or 13 v. Current is 60 cycle ac only.

Bearings on which final shaft and various gear shafts operate are of semioilless, sintered bronze, rigidly held in a die-cast housing. Two additional models are available to take care of devices requiring

more power. These units, No. 300-A and No. 300-B are designed with additional lamination stackings to accommodate more wire in the field coils to meet extra power requirements.

16. Chuck Demagnetizer

Alternating current combination rectifier and demagnetizers are being incorporated into the laminated top Hermeti-Coil magnetic chucks offered by Hanchett Mfg. Co., Big Rapids, Mich. Available in chucks of sizes 6 x 24 in. and smaller, the unit, called the Neutrofier, is compact and may be mounted anywhere for the operator's convenience. It operates from any alternating current outlet.

By a snap of the control, the unit will demagnetize the magnetic chuck and parts completely and automatically in a few seconds. Unit can also be used to demagnetize other parts from other operations.

17. Steel Stamp Holder

Steel stamp holder for marking pipe, tubing, steel plate and any other round or flat surface is announced by M. E. Cunningham Co., 172 East Carson street, Pittsburgh 19. Of one solid piece of alloy steel, its bottom is shaped out to allow for proper positioning and leveling of stamps on tubing and pipe.

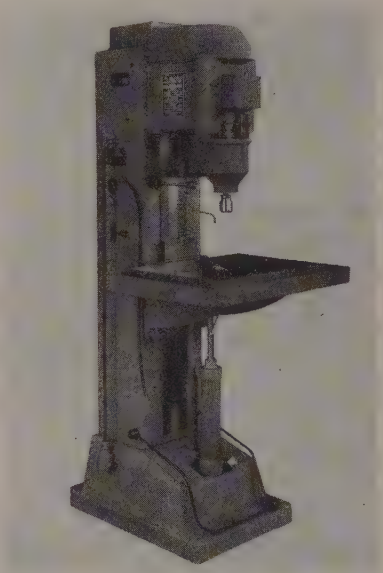
Holder embodies individual floating springs for holding stamps firmly in place. Stamps are removed or inserted quickly and easily, the springs fitting into individual recesses, which allow them to "float" with the stamps. A knurled pipe handle is provided for holding the stamp holder firmly. Latter is welded to the end of the holder, and includes a machined-out guide or leveler to make positioning easier. The holder is being made to accommodate number and size of stamps to be used, in single or double-line styles.

18. Combination Air Tool

Around the basic air operated, electrically controlled machine, built by Snow Mfg. Co., 615 South California avenue, Chicago 12, are assembled a drill press, threading machine and a universal tapping machine. Drill press is offered in two sizes—type 1-UD with a capacity in mild steel up to ¼-in. and type 2-UD with a capacity of ⅛ to ⅜-in. Infinite feed, split-second drill control, automatic drill withdrawal and reduced drill breakage are features.

Threading machine, sizes No. 3 and 4, threads accurately, true to lead and thread form and gives a fine finish. Tapping machine is offered in four sizes, type 1-UT with a capacity in mild steel No. 2 to 10 or 3/16-in., type 2-UT, to 5/16-in. N. F., type 3-UT, No. 10 to ½-in. N.F. and type 4-UT (illustrated), ¼ to ¾-in. N.F.

Tool has air operated table raising and lowering unit, cast aluminum air head and rust-resistant bronze cylinder walls and graphite carbon pistons. Controls



are enclosed in welded column. Microswitch actuated solenoid valves provide automatic or controlled operating cycle, synchronize head with automatic, semi-automatic or manually operated holding fixtures.

19. Cutting Attachment

Advantage of a cutting attachment, developed recently by The Linde Air Products Co., New York, is that metal ordinarily scrapped during oxyacetylene cutting can be salvaged for further use. It makes possible cutting of circles to the extreme edge of a plate, and in the corner of any plate. Designed as an accessory for the company's CM-16 portable shape-cutting machine, it enables the latter to cut circles from 2½ to 9 in. radius —radius of circle to be cut being regulated by a simple adjusting screw.

20. Rotary Pump

With a capacity of 2.5 gpm, a pressure of 1000 psi and a vacuum of 26 in. using 150 viscosity oil at 140° F, the series S-125 rotary pump, manufactured by Ellipse Corp., 24 South Clinton street, Chicago 6, will handle oils, gases and water. Pump is silent, vibrationless, nonpulsating and nonreciprocating. It is self-contained and may be mounted in any position. Made of steel and phosphor bronze in regular models, it is also available in corrosion resisting types handling acids. Assembly may be made to make pump operate in either direction.

21. INJECTION MOLDING PRESS

Clamping pressure of 50,000 psi and injection pressure of 12,000 psi are provided with the meterized hydraulic injection 3-oz molding press offered by Munton Mfg. Co., 9400 Belmont avenue, Franklin Park, Ill. Its heating cycle is 2½-oz per minute without preheating; operating cycle, 30 sec, and maximum opening for molds is 12 in. All press operations are governed through levers and treadles.

22. PHOTO COPIER

Accurate, speedy photocopies of anything written, printed, typed, drawn or photographed are possible with the Apeco Photo-Exact manufactured by American Photocopy Equipment Co., 2849 North Clark street, Chicago 14. Operation does not require experienced operators or a darkroom. Copies made will not fade, deteriorate or crack when folded. Various models are available for copy work up to 42 in. in width.

23. COMBUSTION TUBES

New zirconium refractory base combustion tubes, used in carbon and sulphur analysis, withstand high temperatures and thermal shock and resist metal splatter. Manufactured by Harry W. Dietert Co., 9330 Roselawn avenue, Detroit 4, the tubes are offered in various sizes, with restricted and open ends. Other features are gas tightness and extra long life at temperatures up to 2800° F.

24. SMALL DRILL CHUCK

Adjustable to absolute concentricity, the collet chuck offered by Chicago-Latrobe Twist Drill Works, 411 Ontario street, Chicago 10, permits alignment with the drill press, and once aligned, it need not be reset when drills are changed. Called the Micro-Chuck, it is made with two collet sizes, one with a capacity of 0.005 to 0.025-in. and the other for 0.020 to 0.040-in.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Steadier Price Tone Develops In Leading Metal Markets

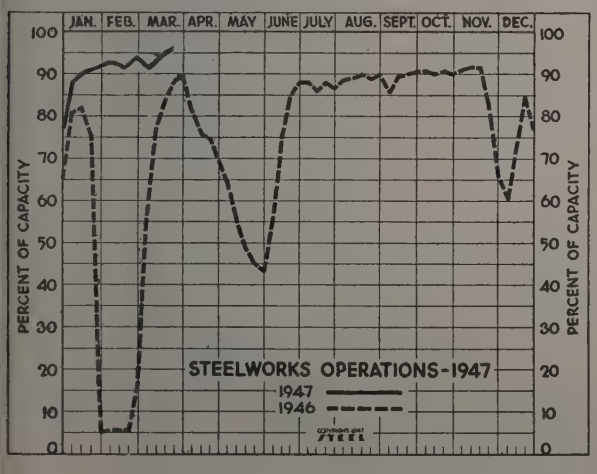
Steel scrap prices level off, following sharp and persistent advances since first of year, as buying resistance stiffens and supplies increase . . . Revision in extras charges on steel products results in generally lower costs to consumers

METAL prices last week showed definite signs of leveling off and current quotations may mark the crest of the recent general upswing. Weaker undertones in the extremely buoyant scrap market developed in some districts. An aggregate price reduction in steel products was effected by a new revision of extra charges by the leading producer, an action that is expected to be followed by other steelmakers. Among nonferrous metals, silver prices dropped for the second week. However, upward revisions for certain ferroalloys are announced for second quarter contracts.

Revision of extra charges for certain major steel products results in reductions ranging up to $10 a ton, depending on specification. Both upward and downward revisions are included in the adjustments, but the aggregate results in moderate price reductions. Most of the extra lists had been revised during December and January; the current changes are designed to correct inequities and ti simplify the extra card structure.

Evidences of potential reaction in the scrap market are noted following the sharp price advances of recent weeks, although prices continued to edge upwards slightly last week. Open weather has stimulated the flow and has enabled some scrap consumers to accumulate a little inventory for the first time in weeks.

Although ingot output is being maintained at a record peacetime pace, finishing mills have been unable to make much headway toward reducing their heavy order backlogs. Their efforts in this direction will be impeded during the second and subsequent quarters by the necessity of channeling a larger portion of total production into the car building program. Sheet and plate distribution will be especially affected by this program. Pressure for alloy steel products and large carbon bars appears lighter.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended March 22	Change	Same Week 1946	Same Week 1945
Pittsburgh	99	+ 2.5	96.5	91.5
Chicago	95	+ 1	88	101.5
Eastern Pa.	90	+ 2	83	95
Youngstown	91	None	88	93
Wheeling	93.5	+ 4.5	90.5	98.5
Cleveland	95	+ 1	96.5	91.5
Buffalo	90.5	None	83.5	90.5
Birmingham	99	None	95	95
New England	94	None	91	88
Cincinnati	91	None	76	76
St. Louis	74.5	None	54	80
Detroit	90	None	90	91
Estimated national rate	96.5	+ 1.5	88.5	97

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

One of the leading steel producers issued a statement last week setting forth its position in regard to the so-called "black" market, since its operators have impugned the integrity of steel company managements generally. Asserting that it has not participated in the black market and is continuing to distribute its steel products in normal channels only, the company said "we are convinced that the large and continuing tonnages offered are not available. Unfortunately some small transactions have been uncovered and . . . . such exploitation of the current shortage of steel is harmful to the industry, to its customers, and to the national economy."

Estimated national steelmaking operations increased for the third consecutive week, being 1.5 points higher at 96.5 per cent of capacity. This was the highest rate since the week ended Apr. 7, 1945, when the nation was engaged in a two-front war. Last week's rate was equivalent to production of about 1,687,000 net tons of ingots and castings compared with about 1,676,000 tons in the preceding week.

Operations increased 4.5 points in Wheeling to 93.5 per cent, 2.5 points in Pittsburgh to 99 per cent, 2 points to 90 per cent in eastern Pennsylvania, and 1 point to 95 per cent in Chicago and Cleveland. Elsewhere, district ingot rates held unchanged at 99 per cent in Birmingham (unchanged for the year to date), 94 per cent in New England, 91 per cent in Youngstown and Cincinnati, 90.5 per cent in Buffalo, 90 per cent in Detroit, and 74.5 per cent in St. Louis.

STEEL's composite market averages advanced to $38 from $37.92 for steelmaking scrap while holding unchanged at $32.49 for steelmaking pig iron, $52.10 for semifinished steel, and a revised figure of $69.82 for finished steel.

COMPOSITE MARKET AVERAGES

	Mar. 22	Mar. 15	Mar. 8	One Month Ago Feb., 1947	Three Months Ago Dec., 1946	One Year Ago Mar., 1946	Five Years Ago Mar., 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$64.75	$63.54	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	41.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.11	29.56	29.10	25.13	23.00
Steelmaking Scrap	38.00	37.92	35.58	32.73	27.69	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig IronComposite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	March 22, 1947	Feb., 1947	Dec., 1946	Mar., 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.55c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.91	2.82
Steel bars, Chicago	2.60	2.60	2.55	2.50
Shapes, Pittsburgh	2.50	2.50	2.35	2.35
Shapes, Philadelphia	2.64	2.64	2.48	2.465
Shapes, Chicago	2.50	2.50	2.35	2.35
Plates, Pittsburgh	2.65	2.65	2.50	2.50
Plates, Philadelphia	2.85	2.85	2.558	2.55
Plates, Chicago	2.65	2.65	2.50	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.48	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.19	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	†3.675	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.481	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.218	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	†3.675	†4.05
Hot-rolled strip, Pittsburgh	2.50	2.50	2.462	2.35
Cold-rolled strip, Pittsburgh	3.20	3.20	3.162	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.05	3.05
Wire nails, Pittsburgh	4.125	4.125	3.75	3.25
Tin plate, per base box, Pittsburgh	$5.75	$5.75	*$5.25	*$5.25

* Nominal. † Base changed in December to 10 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$38.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	39.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	39.00	39.00
Wire rods 5/32 to ¼-inch, Pitts.	2.675c	2.675c	‡2.425c	‡2.30c

‡ Base, No. 5 to 5/16-in.

Pig Iron

	March 22, 1947	Feb., 1947	Dec., 1946	Mar., 1946
Bessemer, del. Pittsburgh	$34.83	$31.83	$31.77	$27.315
Basic, Valley	33.00	30.00	29.50	25.625
Basic, eastern del. Philadelphia	35.52	32.01	31.93	27.465
No. 2 fdry., del. Pgh. N. & S. sides	34.33	31.33	31.27	26.815
No. 2 fdry., del. Philadelphia	36.02	32.51	32.43	27.965
No. 2 foundry, Chicago	33.00	30.50	30.00	26.125
Southern No. 2 Birmingham	29.88	26.88	26.88	26.565
Southern No. 2, del. Cincinnati	34.75	31.75	30.94	27.965
Malleable, Valley	33.50	30.50	30.00	26.125
Malleable, Chicago	33.50	30.50	30.00	26.125
Charcoal, low phos., fob Lyles, Tenn.	40.50	37.50	37.50	37.340
Gray forge, del. McKees Rocks, Pa.	33.66	30.66	30.61	26.315
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.00	140.000

Scrap

Heavy melting steel, No. 1, Pittsburgh	$38.00	$33.75	$28.50	$20.00
Heavy melt. steel, No. 2, E. Pa.	40.00	33.25	27.38	18.75
Heavy melting steel, Chicago	36.00	31.25	27.19	18.75
Rails for rerolling, Chicago	41.50	38.50	31.00	22.25
No. 1 cast, Chicago	43.50	42.50	36.90	20.00

Coke

Connellsville, furnace ovens	$8.875	$8.875	$8.75	$7.50
Connellsville, foundry ovens	10.375	9.875	9.50	8.25
Chicago, by-product fdry., del.	16.10	16.10	15.288	13.75

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich., $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, lb 2.35c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5/16 to ¼-in., inclusive, $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base, del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c, San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-†6.70c; double refined, 7.00c-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c. (Andrews Steel Co., quotes on Middletown, O., base for shipment to Detroit area; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, not corrugated, copper alloy: Pittsburgh, Chicago, Gary, Birmingham, 4.15c; Granite City, 4.25c; copper iron 4.50c; pure iron, 4.50c.

Aluminized Sheets, No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: 4.20c, Pittsburgh, Chicago, Gary; 4.30c, Kokomo, Ind. Armature: 4.50c, Pittsburgh, Chicago, Gary; 4.60c, Granite City, Ill., Kokomo, Ind. Electrical: 5.00c, Pittsburgh, Chicago, Gary; 5.10c, Granite City, Kokomo. Motor: 5.75c, Pittsburgh, Chicago, Gary; 5.85c, Granite City. Dynamo: 6.45c, Pittsburgh; 6.55c, Granite City. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del., 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $13.50; 15-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c. San Francisco and Los Angeles, del., 3.46-3.52c. (Central Iron & Steel Co., Harrisburg, Pa., 3.40c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)

Floor Plates: Pittsburgh, Chicago, 3.90c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.

Clad Steel Plates: Coatesville, 10% cladding: nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.70c; Phila., del., 2.64c. San Francisco and Los Angeles, del., 3.37c-3.41c.

(Phoenix Iron Co., Phoenixville, Pa., nominally, 3.05c, Bethlehem, Pa., equivalent.)

Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer .....*$3.30-$3.55
Spring (except Birmingham) **$4.25

Wire Products to Trade

Nails and Staples

Standard and cement-coated.....†$3.75-$4.50
Galvanized .....‡$3.75-$4.50

Wire, Merchant Quality

Annealed (6 to 8 base) ..... §$3.95
Galvanized (6 to 8 base) ..... §$4.40
(Fob Pittsburgh, Chicago, Birmingham, per base column)

Woven fence, 15 gage and heavier..... ††84
Barbed wire, 80-rod spool ..... ††94
Barbless wire, twisted 94
Fence posts (no clamps) ..... ††82
Bale ties, single loop ..... ††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.

** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28, black premier.

† Worcester $4.05, Cleveland $3.85, base. San Francisco (base del.) $4.83.

‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

§ Worcester $4.05, annealed, $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.

†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb. fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), $2.95, Williamsport, Pa.

Relaying, 60 lb and over, fob railroad and basing point, $46-$49 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	48	23	¼	— 2	+20
¼ & ⅜	51	30½	⅜	—11½	+10
½	55½	41	1-1¼	—17	+ 2
¾	58½	45	1½	—22½	— 1½
1-3	60½	47½	2	—23	— 2

Lap Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
2	53	39½	1¼	— 1	+20
2½-3	56	42½	1½	— 7	+13
3½-6	58	44½	2	—14½	+ 5½
*8	58	42½	2½-3½	—17	+ 1½
*10	57½	42	4	—21	— 4
*12	56½	41	4½-8	—19	— 2½
			9-12	—10	+ 7

* Not T. & C.

Seamless

	Steel				
In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D.		—Seamless—		—Elec. Weld—	
Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	12	17.05	20.26	16.71	20.00
2½"	12	18.78	22.31	18.38	22.00
2¾"	12	20.57	24.43	20.11	24.07
3"	12	21.80	25.89	21.27	25.46
3¼"	11	22.87	27.18	22.26	26.68
3½"	11	26.88	31.94	26.15	31.33
4"	11	28.86	34.30	28.06	33.64
4½"	9	35.82	42.55	34.78	41.68
5"	9	47.48	56.42	....	....
6"	9	54.96	65.30	....	....
	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine

½-in. and smaller; up to 6 in. in length ..... 55 off
⅝ and ⅝, up to 6 in. in length ..... 52 off
⅝ x 6 in. ..... 49 off
⅞ and 1 in. x 6 in. length ..... 51 off
1⅛ in. and larger in all lengths and ⅞ in. and larger in lengths over 6 in. ... 48 off
½ in. and smaller, longer than 6 in. ... 45 off
Tire bolts .....38½ off
Step bolts ..... 46 off
Plow bolts ..... 57 off

Stove Bolts

In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

	A.S. Light	A.S. Reg. and Heavy
Semifinished hexagon	51 off	....
⅛-in. and smaller	....	48 off
¼-in. and smaller	48 off	....
⅜-in.-1-in.	....	47 off
1⅛-in.-1½-in.	46 off	45 off
1⅝-in. and larger	....	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright).... 50 off
Upset (10-35 heat treated)
⅝ x 6 ..... 51 off
¾, ⅞ & 1 x 6 ..... 47 off

Square Head Set Screws

Upset 1-in. and smaller ..... 51 off
Headless, ¼-in. and larger ..... 46 off
No. 10 and smaller ..... 36 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural 5.25c
Lebanon, Pa. 5.40c
⅞-in and under .....35-5 off
Lebanon, Pa. .....55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl .....$1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.43c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
....	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plates	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
308....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A ..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	33.50
430....	21.00	24.00	31.50	19.00	24.50
430F...	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	35.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

PIG IRON

Prices per gross ton. Minimum delivered prices do not include 3 per cent federal tax.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†**Neville Island, Pa.,** base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	....	36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
*Youngstown, O., base	33.50	33.00	34.00	33.50
*Mansfield, O., del.	36.48	35.98	36.98	36.48

* Quoted prices were effective as of Mar. 1, 1947.

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base)	$40.50
6.51-7.00	$41.50
7.01-7.50	42.50
7.51-8.00	43.50
8.01-8.50	44.50
8.51-9.00	45.50
9.01- 9.50	46.50
9.51-10.00	47.50
10.01-10.50	48.50
10.51-11.00	49.50
11.01-11.50	50.50

Fob Jackson, O., per gross ton, Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $52.75, Jackson, O.; $56 Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.... $40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $39, base; Philadelphia, $41.16, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	14.00

Foreign Ore

Cents per unit, cif Atlantic ports

N. African low phos	Nom.
Swedish basic, 60 to 68%	13.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Wolframite, per short ton unit, duty paid	$24–$25

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00

Domestic (seller's nearest rail)

48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty	
Pa., Mo., Ky.	$81.00
High Heat Duty	
Pa., Ill., Md., Mo., Ky.	65.00
Ala., Ga.	65.00
N. J.	70.00
Intermediate Heat Duty	
Ohio	57.00
Pa., Ill., Md., Mo., Ky.	59.00
Ala., Ga.	51.00
N. J.	62.00
Low Heat Duty	
Pa., Md., Ohio	51.00

Malleable Bung Brick

All bases	75.00

Ladle Brick

(Pa., O., W. Va., Mo.)	
Dry Press	42.00
Wire Cut	40.00

Silica Brick

Pennsylvania	65.00
Joliet, E. Chicago	74.00
Birmingham, Ala.	65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.	
Bulk	24.00
Single bags	28.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$8.75–$9.00
Connellsville, foundry	9.75–11.00
New River, foundry	11.75
Wise county, foundry	11.15
Wise county, furnace	10.65

* Operators of hand-drawn ovens using trucked coal, $9.35-$9.60.

By-Product Foundry

Kearney, N. J., ovens	15.35
Chicago, outside del.	15.10
Chicago, del.	16.10
Terre Haute, del.	15.60
Milwaukee, ovens	15.85
New England, del.	17.25
Birmingham, del.	12.35
Indianapolis, ovens	14.50
Cincinnati, del.	15.39
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens	14.50

Coke By-Products

Spot, gal, freight allowed east of Omaha

Pure and 90% benzol	17.00c
Toluol, two degrees	22.00c
Industrial xylol	22.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	3.85	3.75–3.85	...	...	...
Cold-Rolled	4.55–4.75	4.55–4.75	4.55–4.75	4.75	...	4.55–4.75	...	...	...
Galvanized	5.40	.....	.....	...	...	.....	...	...	...
Strip, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes	4.00	4.00	4.00	4.00	...	4.00	4.00	4.00	4.00

Note: Lower level of quoted ranges represent prices for NAX High Tensile, produced by Great Lakes Steel Corp Detroit.

WAREHOUSE STEEL PRICES

Base prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. •10G	Gal. •24G	‡H-R	C-R	H-R	C-F	H-R Alloy ($4140)	Structural Shapes	Carbon ¾"-¾"	Floor ¾" & Thicker
Boston (city)	4.50	....	5.22[4]	6.80[4]	6.80[4]	4.65	6.36	4.62	5.47	7.12	4.47	4.80	6.42
††New York (city)	4.42	....	5.27[3]	5.47[3]	....	4.62	....	4.62	5.42	8.42[12]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[3]	5.37[3]	....	4.52	....	4.52	....	..	4.27	....	6.25
Philadelphia (city)	4.24	5.73[3]	5.33[3]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.38	6.87	4.22	4.40	5.93
Philadelphia (country)	4.14	5.63[3]	5.23[3]	5.19[5]	6.44[5]	4.33	5.18	4.38	....	6.60	4.12	4.30	5.83
Baltimore (city)	4.09	6.15[3]	5.65[3]	5.14[5]	6.39[5]	4.40	....	4.45	5.35	....	4.34	4.39	5.90
Baltimore (country)	3.59	6.05[3]	5.55[3]	....	....	....	....	....	4.85	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[5]	6.43[5]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35	....	....	....	....	....	....	4.75	5.50	....	4.50	4.50	6.25
Buffalo (city)	4.00	....	4.70[6]	4.35[5]	....	4.30	4.95	4.05	4.95	....	4.05	4.60	5.90
Buffalo (country)	3.90	....	4.60[6]	4.95[5]	....	3.90	4.60	3.95	4.85	6.60	3.95	4.20	5.45
Pittsburgh (city)	4.00	5.15[3]	4.70[3]	5.05[5]	6.30[5]	4.00	4.95	4.05	4.95	6.60	4.05	4.30	5.55
Pittsburgh (country)	3.90	5.05[3]	4.60[3]	4.95[5]	6.20[5]	3.90	4.85	3.95	4.85	6.60	3.95	4.20	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.15	5.30	4.85	5.42	6.67	4.34	5.24	4.20	5.12[13]	7.01	4.42	4.59	5.92
Cleveland (city)	4.00	5.15[3]	4.70[3]	5.238[5]	6.488[5]	4.00	5.05	4.05	4.95	6.858	4.311	4.30	5.811
Cleveland (country)	3.90	5.05[3]	4.60[3]	....	....	3.90	4.95	3.95	4.85	....	....	4.20	....
Cincinnati	4.116	5.266[3]	....	5.166[5]	....	4.394	....	4.403	5.303	....	4.444	4.653	5.944
Chicago (city)	4.00	5.15[3]	4.70[3]	5.05[5]	6.30[5]	4.00	5.05	4.05	4.95	6.60	4.05	4.30	5.70
Chicago (country)	3.90	5.05[3]	4.60[3]	4.95[5]	6.20[5]	3.90	4.95	3.95	4.85	6.60	3.95	4.20	5.60
Milwaukee	4.199	5.349[3]	4.899[3]	5.249[5]	6.499[5]	4.199	5.249	4.249	5.149	6.899	4.249	4.499	5.899
St. Paul	4.384[1]	5.534[3]	5.084[3]	5.434[5]	6.684[5]	4.404[13]	....	4.434[13]	5.726[11]	7.084[11]	4.434[13]	4.684[13]	6.084[13]
Indianapolis	4.04	....	4.84[3]	5.29[5]	6.54[5]	4.24	....	4.36†‡	5.26	....	4.36	4.61	6.01
St. Louis	4.199	....	4.899[3]	....	6.674[5]	4.199	....	4.249	5.324[13]	7.074	3.999	3.999	5.999
Birmingham (city)	3.85[20]	....	....	5.20[5]	....	4.10[20]	....	4.05[20]	5.83	....	4.05	4.30	6.56
Birmingham (country)	3.75[20]	....	....	5.20[5]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.46••	....	5.77[3]	....	....	4.83[20]	....	4.78••	6.14[11]	..	4.68••	4.83[20]	6.94[20]
Houston, Tex.	4.50[1]	....	....	....	6.00[13]	5.80[1]	....	•••	....	....	....	5.60	6.40
Omaha, Nebr.	4.868	6.118[3]	....	5.918[5]	7.168[5]	4.862	....	4.918	5.818[11]	....	4.918	5.168	6.568
Los Angeles	5.55	....	7.10[3]	....	8.10[5]	5.65	8.35	5.10	6.90[19]	7.85	5.20	5.20	7.20
San Francisco	4.90§§	....	6.30[3]	....	7.35[5]	5.20[14]	8.35	4.75[14]	•••	9.35[18]	4.90[14]	5.00[14]	6.80[14]
Tacoma, Wash.	....	....	....	7.30[5]	....	5.20[17]	....	4.90[17]	6.75[19]	8.95[19]	4.95[17]	5.25[17]	7.25[17]
Seattle	....	....	....	7.30[5]	....	5.20[17]	....	4.90[17]	6.75[19]	8.95[19]	4.95[17]	5.25[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 to 39,999 pounds; cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 49,999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]1500 to 89,999; [20]—400 to 3999 pounds.

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ basing point cities with quotations representing mill prices plus warehouse spread; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; •• add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; ••• rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco; bar size angles, flats, rounds 5.00c, squares and half ovals 5.15c and bar size channels 5.55c at Houston.

PRICES OF LEADING FERROALLOY PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., Pittsburgh, $44.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.70c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, carlots, bulk 6.40c, packed 6.90c, ton lots 7.30c, smaller lots 7.70c, eastern, freight allowed; 6.65c, 7.15c, 7.90c and 8.30c, central; 7.20c, 7.70c, 9.80c and 10.20c, western; spot up 0.25c; notched up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.10; contract, $1.98; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Ferrovanadium: V .35-.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.95c, ton lots 13.45c, smaller lots 13.95c; 80-90%, c.l. 11.35c, ton lots 11.90c, smaller lots 12.45c; 75%, c.l. 10.15c, ton lots 10.75c, smaller lots 11.35c; 50% c.l. 8.45c, ton lots 9.10c, smaller lots 9.75c. Deduct 1.0c for bulk carlots 75%, 80-90%, 90-95%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots.

High carbon, high nitrogen, add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c; add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 20.00c, packed 20.15c; ton lots 21.00c, smaller lots 22.00c, eastern, freight allowed, per pound contained Cr; 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched, 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, 15.50c, ton lots 16.50c, smaller lots 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si

60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, smaller lots 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 13.65c; 2000 lb to c.l., 15.05c; central zone, 14.25c and 17.30c; western, 14.85c and 19.05c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 13.15c, 2000 lb to c.l. 14.65c; central, 13.85c and 16.90c; western, 14.45c and 18.65c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si eastern zone, bulk, c.l. 6.15c, ton lots 7.05c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Ferrosilicon: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.20c, ton lots 4.60c, smaller lots 5c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.35c, ton lots 4.75c, less 5.15c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 12.50c, ton lots 13.25c, smaller lots 14.00c, eastern zone, freight allowed; 12.80c, 14.35c and 15.10c, central; 12.80c, 16.30c and 17.05c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract or spot, carlots, bulk 12.00c, packed 12.75c; ton lots 13.50c, smaller lots 14.25c, eastern zone, freight allowed; 12.30c, 13.05c, 14.60c, 15.35c, central; 12.30c, 13.05c, 16.65c, 17.30c, western.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) Prices per lb of alloy, contract or spot, carlots, bulk 11.75c, packed 12.50c, ton lots 13.25c, smaller lots 14.00c, eastern, freight allowed; 12.05c, 12.80c, 16.30c, 17.05c, western.

Zirconium Alloy: 12-15%, per lb of alloy, eastern, contract, carlots, bulk 4.85c, packed 5.30c, ton lots 5.65c, smaller lots 6.00c; spot up 0.25c.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.50c, ton lots 15.75c, smaller lots 17.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $2.80, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1, 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Steadiness Marks Nonferrous Metals

Prices continue firm in copper, lead, zinc and tin . . . Silver drops to 70.875c

NEW YORK—Ore reserves of copper, lead and zinc are ample to continue to produce at the current rate and even at an increased rate for the next 15 to 25 years, and can for the next 100 years produce enough for every essential need, Clinton H. Crane, president, St. Joseph Lead Co., New York, told the World Conference on Mineral Resources here last week.

"These ore reserves are based on existing mines and mining districts and are qualified on the basis of present costs, and reasonably conservative guesses as to the future selling prices of the metals involved," Mr. Crane said. "Six cents a pound is used in case of lead. The reserves at 20 cents would undoubtedly be infiinitely greater than the reserves at 6 cents." He said the United States has been using between five and ten times as much copper, lead and zinc per capita as the rest of the world.

COPPER—Shipments of refined copper to domestic consumers in February totaled 117,734 tons against 143,692 tons in January, a drop of 25,958 tons, according to the Copper Institute. These were the smallest monthly deliveries since September, 1946, when 113,158 tons were shipped by producers. At that time, the United States copper industry was just recovering from the strikes at mines and refineries during the first half of last year. The drop in February deliveries can be attributed to the reduced tonnages of copper available from government-owned stockpile. It is estimated that at the end of last month only 55,000 tons of foreign copper remained in this stockpile. About 30,000 to 35,000 tons are being allocated to the domestic industry during March. This will leave 20,000 to 25,000 tons to be allocated in April and succeeding months.

Import taxes amounting to $80 a ton on imported copper was suspended for two years under a resolution passed by the House last week. The bill now goes to the Senate.

Initially it was proposed to suspend the duty for three years, but the period was reduced under an amendment. The bill, H. R. 2404, was sponsored by Representative C. A. Herter, Massachusetts, in a move he said was designed to supply American consumers with supplies necessary to keep their industries going, from imports, until domestic production can meet demand.

It was testified that domestic production, normally around 900,000 tons per year, is approximately 400,000 tons short of present combined government and industry needs. Normal consumption, according to House debate, is about 835,000 tons.

During hearings on the bill, John Church, chief of the Metals Division of wartime WPB, testified that removal of the duty would mean imports of 25,000 to 30,000 tons of copper per month in the coming year. Members debating the proposal on the floor expressed opinions that tungsten and zinc would next be proposed for similar relief.

LEAD — Leading sellers indicated last week that no further advance in price is being contemplated, but in view of the fact that foreign prices have advanced another rise in the market here would not be surprising. Sales of foreign refined lead was reportedly made last week at around 14.00c to 14.25c, fas Gulf ports, equal to about 15.50c to 15.75c, New York, duty paid. The domestic market held last week at 15.00c, New York, and 14.80c to 14.85c, East St. Louis.

ZINC — Dr. N. H. Engle, director, University of Washington Bureau of Business Research, reports that newly discovered zinc deposits in northeast section of Washington exceed the most optimistic expectations. Several companies are planning to develop zinc deposits in Skagit, Stevens and Pend Oreille counties. The domestic market held last week at 10.50c, East St. Louis, for prime western.

TIN — Demands for allocation for the first half of this year total almost 60,000 tons whereas new supplies available for allocation from all sources during that period total only 17,700 tons, according to the Combined Tin Committee. Prices remain firm at 70.00c New York.

SILVER — Price of silver on the open market here eased to 70.875c an ounce last week. While the supply of foreign metal continued larger than domestic demand, the amounts offered were on a smaller scale than in the previous week. At the same time, during the latter part of last week sellers were not pressing the silver that was offered for sale at sharp concessions.

Alcoa Premiers New Movie On Processing of Aluminum

Aluminum Co. of America, Pittsburgh, held a premier of its new film, "This Is Aluminum," at the Monte Carlo, New York, recently. The movie showed graphically the steps necessary in mining bauxite as well as the costly technical processes involved in refining ore before it can be reduced electrolytically to metallic aluminum.

The electrolytic process was shown in detail, not only by regular photography but also with cut-away models. The picture ended with a number of fabricating scenes including casting, rolling, forging and extrusion.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, del. Conn.; Lake, 21.62½c, del. Conn. Dealers may add ⅜c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 19.25c-21.25c, refinery, 20,000 lb or more; 19.50c-21.50c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 21.50c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 24.50c; No. 1 yellow (No. 405) 17.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.37½c; No. 12 foundry alloy (No. 2 grade) 15.62½c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 17.00c; grade 2 (92-95%) 16.00c; grade 3 (90-92%) 15.25c; grade 4 (85-90%) 14.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straights), 70.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 69.87½c; Grade C, 99.65-99.79% incl. 69.62½c; Grade D, 99.50-99.64% incl., 69.50c; Grade E, 99-99.49% incl. 69.12½c. Grade F, below 99% (for tin content), 69.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 28.25c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 28.75c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $86-$90 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 70.875c per ounce.

Platinum: $57-$61 per ounce.

Paladium: $24 per troy ounce.

Iridium: $110 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; Yellow brass 28.88c; commercial bronze, 95% 32.97c, 90% 32.36c; red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29.28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlot 28.12c, less carlots 28.62c; magnet, delivered, carlots 31.13c, 15,000 lb or more 31.38c, less carlots 31.88c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.25-13.50c; over 12-in., 14.25-14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads, 20.00c; 5 tons and over, 25.00c; 1 to 5 tons, 21.00c; less than 1 ton, 21.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels, nom.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls, 41.50c fob Niagara Falls.

Sodium Cyanide: 96-98%, ½-oz balls, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Cast and rolled carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 30,000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 22.00c.

Tin Anodes: Bar, 1000 lb and over 82.50c; 500 to 1000 lb, 83.00c; 200 to 500 lb, 83.50c; less than 200 lb, 84.00c; ball, 1000 lb and over, 84.75c, 500 to 1000 lb, 85.25c, 200 to 500 lb, 85.75c; less than 200 lb, 86.25c, fob Sewaren, N. J.

Tin Chloride: 400 lb bbls, nom., fob Grasselli, N. J.; 100 lb kegs, nom.

Sodium Stannate: In 100 or 200 lb drums, 49.00c; 4 to 11 kegs, 47.00c; 12 to 20 kegs, 44.30c; 21 kegs and over, 43.50c; in 350-lb bbl, 46.50c; 4 to 5 bbls, 43.80c; 6 bbls and over, 43.00c; fob Chicago, freight allowed east of Mississippi on 100 lb and over.

Zinc Cyanide: 100-lb drums, 35.00c, fob Cleveland; 34.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.750

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00, No. 2 copper 17.00, light copper 16.00, composition red brass 16.75, auto radiators 13.25, heavy yellow brass 12.00, brass pipe 12.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 19.25-19.50; No. 2 copper, 17.75-18.50, light copper 16.75-17.50; refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 17.62½c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.50-17.00; No. 2 15.50-16.00; light copper 14.25-14.75; No. 1 composition red brass 14.25-14.50, No. 1 composition turnings 14.00-14.25, mixed brass turnings 9.75-10.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 11.75-12.25, light brass 8.50-9.00, heavy yellow brass 9.75-10.00, new brass rod ends 12.00-12.50, auto radiators, unsweated 11.50-12.00, clean red car boxes 12.50-13.00, cocks and faucets 11.25-11.50, brass pipe 11.00-11.50.

Lead: Heavy lead 12.50, battery plates 7.50-7.75, linotype and stereotype 13.50-14.00, electrotype 11.50-12.00, mixed babbitt 12.00-12.50, solder joints 13.50-14.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 4.50-5.00, old die cast scrap 3.50-4.00.

Tin: No. 1 pewter 44.00-45.00, block tin pipe 60.00-62.00, auto babbitt 35.00-36.00, No. 1 babbitt 35.00-38.00, siphon tops 38.00-40.00.

Aluminum: Clippings, 2S, 9.00-9.50, old sheets 7.00-7.50, crankcase 7.00-7.50, borings and turnings 3.00, pistons, free of struts, 6.75-7.00.

Nickel: Anodes 19.50-20.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00, old sheet 12.00-13.00, rods 12.50-13.00, castings 10.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH:

Prices for steelmaking grades from remote points range from $42 to $46, depending on the freight.

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1, 2 & 3 Bundles	38.00
Machine Shop Turnings	32.50-33.50
Mixed Borings, Turnings	32.50-33.50
Short Shovel Turnings	34.00-34.50
Cast Iron Borings	30.50-31.50
Bar Crops and Plate	38.50-39.50
Low Phos. Cast Steel	40.50-41.50
Punchings & Plate Scrap	40.50-41.50
Elec. Furnace Bundles	37.50-38.50
Heavy Turnings	35.50-36.50
Alloy Free Turnings	35.50-36.50
Cut Structurals	41.50-42.00
No. 1 Chemical Borings	34.50-36.50

Cast Iron Grades

No. 1 Cupola	43.50-44.50
Charging Box Cast	39.00-39.50
Heavy Breakable Cast	37.50-38.50
Stove Plate	43.50-44.50
Unstripped Motor Blocks	42.00-43.00
Malleable	46.00-47.00
Brake Shoes	32.00-35.00
Clean Auto Cast	47.00-48.00
No. 1 Wheels	41.00-42.00
Burnt Cast	36.00-37.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	48.00-50.00
Axles	43.00-46.00
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	37.00-40.00
Rails, 3 ft and under	39.00-42.00
Rails, 18 in. and under	40.00-44.00
Railroad Specialties	41.00-45.00
Uncut Tires	40.50-42.50
Angles, Splice Bars	39.00-44.00

CLEVELAND:

Prices for open hearth, electric furnace and foundry grades from remote points range several dollars per ton higher, depending on freight charges.

No. 1 Heavy Melt. Steel	$37.50
No. 2 Heavy Melt. Steel	37.50
No. 1 Busheling	37.50
Nos. 1 & 2 Bundles	37.50
Machine Shop Turnings	31.00
Mixed Borings, Turnings	32.00
Short Shovel Turnings	32.00
Cast Iron Borings	32.00
Bar Crops and Plate	40.00-45.00
Cast Steel	40.00-45.00
Punchings & Plate Scrap	40.00-45 00
Elec. Furnace Bundles	40.00-42.00
Heavy Turnings	36.50
Alloy Free Turnings	31.00
Cut Structurals	40.00-45.00
No. 1 Chemical Borings	33.00

Cast Iron Grades

No. 1 Cupola	46.00-50.00
Charging Box Cast	42.00
Stove Plate	45.00
Heavy Breakable Cast	44.00-46.00
Unstripped Motor Blocks	45.00
Malleable	50.00
Brake Shoes	43.00
Clean Auto Cast	50.00
No. 1 Wheels	43.00
Burnt Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00-50.00
Rails, Rerolling	48.00-50.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	50.00
Railroad Specialties	45.00
Uncut Tires	44.00
Angles, Splice Bars	48.00

VALLEY:

Prices for open hearth, electric furnace and foundry grades from remote points range several dollars per ton higher, depending on freight charges.

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Bundles	38.00
Machine Shop Turnings	33.00
Short Shovel Turnings	34.00
Cast Iron Borings	34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00

MANSFIELD:

Prices for open hearth, electric furnace and foundry grades from remote points range several dollars per ton higher, depending on freight charges.

No. 1 Heavy Melt. Steel	$38.00
Machine Shop Turnings	33.00
Short Shovel Turnings	35.00

CINCINNATI:

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
No. 1 Bundles	37.00
No. 2 Bundles	37.00
Machine Shop Tunings	28.00
Mixed Borings, Turnings	26.00
Short Shovel Turnings	29.00
Cast Iron Borings	29.00

Cast Iron Grades

No. 1 Cupola Cast	44.00
Charging Box Cast	37.00
Heavy Breakable Cast	39.00
Stove Plate	34.00
Unstripped Motor Blocks	36.00
Brake Shoes	32.00
Clean Auto Cast	43.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	46.00
Rails, Rerolling	41.00
Rails, Random Lengths	41.00
Rails, 18 in. and under	46.00

DETROIT:

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	26.00-26.50
Mixed Borings, Turnings	26.00-26.50
Short Shovel Turnings	27.00-27.50
Cast Iron Borings	27.00-27.50
Punchings & Plate Scrap	37.00-38.00

Cast Iron Grades

No. 1 Cupola Cast	$39.00-42.00
Heavy Breakable Cast	33.00-35.00
Clean Auto Cast	39.00-42.00

BUFFALO:

No. 1 Heavy Melt. Steel	$40.00-41.00
No. 2 Heavy Melt. Steel	40.00-41.00
No. 1 Busheling	40.00-41.00
Nos. 1 & 2 Bundles	40.00-41.00
No. 3 Bundles	35.00-36.00
Machine Shop Turnings	33.00-34.00
Mixed Borings, Turnings	33.00-34.00
Short Shovel Turnings	35.00-36.00
Cast Iron Borings	32.00-33.00
Punchings & Plate Scrap	39.00-41.00
Elec. Furnace Bundles	38.00-39.00
Alloy Free Turnings	36.00-37.00

Cast Iron Grades

Charging Box Cast	43.00-44.00
Heavy Breakable Cast	42.00-43.00
Stove Plate	43.00-44.00
Malleable	46.00-47.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	43.00-44.00

PHILADELPHIA:

No. 1 Heavy Melt. Steel	$40.00
No. 2 Heavy Melt. Steel	40.00
No. 1 Busheling	40.00
No. 1 & No. 2 Bundles	40.00
No. 3 Bundles	36.00
Machine Shop Turnings	32.00-32.50
Mixed Borings, Turnings	29.00-32.00
Short Shovel Turnings	32.00-32.50
Cast Iron Borings	29.00-30.00
Bar Crops and Plate	43.00-44.00
Cast Steel	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Elec. Furnace Bundles	40.00-41.00
Heavy Turnings	39.00-39.50
Cut Structurals	43.00-44.00
No. 1 Chemical Borings	36.50-37.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-52.00
Charging Box Cast	47.00-47.50
Heavy Breakable Cast	47.00-47.50
Unstripped Motor Blocks	44.00-44.50
Malleable	50.00-51.00
Clean Auto Cast	50.00-52.00
No. 1 Wheels	48.00-49.00

NEW YORK:

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.50
Mixed Borings, Turnings	29.50
Short Shovel Turnings	29.50
Punchings & Plate Scrap	38.50-39.00
Elec. Furnace Bundles	38.00
Cut Structurals	38.50-39.00
No. 1 Chemical Borings	28.00

Cast Iron Grades

No. 1 Cupola Cast	45.50-46.00
Charging Box Cast	43.00-43.50
Unstripped Motor Blocks	43 00-43.50
Malleable	48.00-49.00

BOSTON:

(Fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-36.00
No. 2 Heavy Melt. Steel	35.00-36.00
No. 1 Busheling	35.00-36.00
Nos. 1 & 2 Bundles	35.00-36.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings	30.00-31.00
Bar Crops and Plate	35.00-37.00
Punchings & Plate Scrap	34.00-36.00
Chemical Borings	27.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Charging Box Cast	40.00-42.00
Heavy Breakable Cast	42.00-44.00
Stove Plate	39.00-40.00
Clean Auto Cast	44.00-46.00

CHICAGO:

Prices for open hearth, electric furnace and foundry grades from remote points range several dollars per ton higher, depending on freight charges.

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
Nos. 1 & 2 Bundles	36.00
No. 3 Bundles	34.00
Machine Shop Turnings	30.00-31.00
Mixed Borings, Turnings	30.00-31.00
Short Shovel Turnings	32.00-33.00
Cast Iron Borings	32.00-33.00
Bar Crops and Plate	38.00-39.00
Cast Steel	38.00-39.00
Punchings	38.00-39.00
Elec. Furnace Bundles	38.00-39.00
Heavy Turnings	35.00
Cut Structurals	38.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Malleable	42.00-45.00
Clean Auto Cast	42.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
Rails, Rerolling	40.00-43.00
Rails, Random Lengths	40.00-43.00
Rails, 3 ft. and under	42.00-45.00
Rails, 18 in. and under	41.00-42.00
Railroad Specialties	42.00-45.00
Angles, Splice Bars	42.00-45.00

ST. LOUIS:

No. 1 Heavy Melt. Steel	$35.50-36.50
No. 2 Heavy Melt. Steel	35.50-36.00
Machine Shop Turnings	27.25-27.75
Short Shovel Turnings	29.25-29.75

Cast Iron Grades
(Fob shipping point)

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	30.00-35.00
Heavy Breakable Cast	30.00-32.00
Stove Plate	29.00-34.00
Brake Shoes	28.75-31.00
Clean Auto Cast	35.00-37.00
No. 1 Wheels	34.50-36.50
Burnt Cast	25.00-30.00

Railroad Scrap

R.R. Malleable	41.00-42.00
Rails, Rerolling	40.00-42.00
Rails, Random Lengths	39.00-42.00
Rails, 3 ft and under	40.00-43.00
Uncut Tires	34.50-36.50
Angles, Splice Bars	38.00-40.00

BIRMINGHAM:

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	36.00
Nos. 1 & 2 Bundles	32.50-33.00
Long Turnings	24.00-25.00
Short Shovel Turnings	27.50-28.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.00-38.50
Punchings & Plate Scrap	34.00-34.50
Cut Structurals	35.00-36.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-40.00
Stove Plate	35.00-36.00
No. 1 Wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.50-30.00
R.R. Malleable	37.50-38.00
Axles, Steel	35.50-36.00
Rails, Rerolling	41.00-42.00
Rails, Random Length	33.00-34.00
Rails, 3 ft and under	36.00-37.00
Angles and Splice Bars	37.00-38.00

SAN FRANCISCO:

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

* Fob California shipping point.

SEATTLE:

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast	21.50
Stove Plate	25.50
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES:

No. 1 Heavy Melt. Steel	$17.50
No. 2 Heavy Melt. Steel	16.50
Nos. 1 & 2 Bundles	16.00
Machine Shop Turnings	10.00
Mixed Borings, Turnings	10.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

YOU NEED TO REDUCE THE WEIGHT OF YOUR SETTINGS

FUEL COST PER TON MELTED COULD STAND TRIMMING

POT LIFE SUFFERS FROM HOT SPOTS AND OVERHEATING

put KEMP on your "problem jobs" in tin, lead and salt melting

For example: those who alloy and refine the soft metals want lighter pots for easier tilting and cleaning between melts. KEMP immersion elements can be hoisted out at any time, leaving the pot clear—and all you have to tip is the pot itself, not a ton of brickwork.

For example: any tinplate mill can follow the cue of one of the largest in the East, and cut 40% off its gas bill by switching its stacks from side-firing (through the pot) to KEMP immersion-firing (inside the pot).

For example: heat treaters can minimize chemical attack by molten salt at the liquid line through KEMP pots with stainless steel bands welded in at that point.

And so it goes! The coupon below will put KEMP on the trail of your soft-metal or salt melting problems.

REMEMBER THESE VIRTUES OF KEMP IMMERSION FIRING

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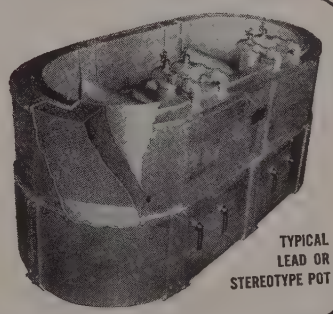

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Sheets, Strip . . .

New revision in extras results in lower prices to flat-rolled product users

Sheet Prices, Page 122

Boston—New revisions in hot strip extras have increased confusion of narrow cold-rolled strip consumers as to steel costs. While uniformity in billing has progressed, changes in the higher carbon range are under consideration, effecting 1095 grade especially over 0.80 carbon with the top of the bracket at 1.05 carbon suggested; between 0.80-0.90 carbon there is a void for many metallurgical applications, including annealing. Tonnage of low-carbon hot strip to cold mills is slightly improved, but the volume of new low-carbon cold-reduced for second and even third quarter is limited by carryovers and backlogs. Stainless and high carbon orders can be entered in slightly better volume through both quarters. Consumers' inventories are low; pressure for deliveries is strong, although new buying is slower due to inability of producers to take on additional volume for nearby delivery. Tack plate supply is slightly improved, but only to the extent of output by a new producer of this grade at Niles, O. Another mill, formerly making tack plate, is considering again rolling this grade. Hot-rolled carbon sheets remain among the tightest of steel products with some easing possible by late third quarter. In sheets, supply of only stainless approximates a balance with demand. Outlook for silicon grades has improved. Better supply of the latter will ultimately improve shortages in electrical components, including fractional and other motors.

Philadelphia — Various sheet fabricators engaged in work for the housing program complain of their inability to get promises of sufficient tonnage for second quarter operations. These mostly are consumers who have no firmly established sources of supply and who assert that now with housing requirements for next quarter being allocated by producers on a voluntary basis they are losing out as the disposition among the mills, they say, is to supply only their regular trade. Appeals to Washington are said to have resulted in promises of relief in some cases.

With the leading producer having recently come out with a modification of extras, it is believed that other sellers will make revisions is the near future.

Cleveland—While sheet quotas for the second quarter have been established at about the same level as for the first period, consumers probably will receive slightly larger shipments due to receipt of delayed first quarter tonnages. Production is expected to be heavier since operations were curtailed last month by gas shortages and other mill complications. Some mills have revised individual customer quotas for the second quarter to correct some distribution inequities which have developed since the first of the year. Supplies of sheet and strip will remain tight throughout the year.

Chicago — Sheet demand exceeds production of all grades by wide margins; nevertheless, consumers ask for increased quotas. The accelerated freight car program to start in April will further upset tonnage available to consumers. One sheetmaker has cut second-quarter quotas 15 per cent because of the tonnage which must be furnished to the car program. Purchasing agents recently have become more demanding, a situation which is attributed to low and unbalanced inventories, and the insistence of management that the matter be rectified.

Birmingham—Sheet mills are under great pressure for deliveries and even more so for increased allocations, neither of which seems presently in the cards, even though production remains consistently high. Backlogs in sheets have hardly been dented. A relatively small tonnage of strip, mostly in cotton ties, is being produced in the South.

Wire . . .

Wire Prices, Page 123

Pittsburgh—Output of wire rods and wire products has recovered substantially from the restricted production pace recorded in recent weeks due to shortage of industrial gas. Supplies are expected to be tight through the balance of this year. Large consumers are exerting additional pressure on their mill sources to obtain requirements of their subcontractors but are meeting with little success. Demand for wire rope is off sharply, with some producers operating well below their former pace. Decision is expected momentarily on whether or not to continue the $20 per ton premium price on 2 to 20 penny nails after Mar. 31.

Boston—For every ton of wire affected by deferments, practically two tons are available for any openings. In most cases, deferments grow out of unbalance in inventory. Overall inquiry for drawn wire is unabated. Relatively better deliveries of rope and welding material are due to increase capacity rather than any serious slump in demand. The same is true of music wire on which capacity increased sharply. Crux of drawn wire schedules continues to be limited rod supply. Not only are nonintegrated mills handicapped, but also consumers drawing their own wire, notably screw manufacturers. For screws, ratio of drawn wire is higher, but range of sizes and grades is restricted. Screw manufacturers are frequently redrawing wire for size. Portsmouth Steel Corp., Portsmouth, O., is shipping some material into this territory and will supply one consumer with a moderate monthly rod tonnage in exchange for sheets.

Chicago—Wiremakers observe no letup in demand for their products, and allotments to consumers are inadequate. This applies particularly to merchant products such as fence, barbed wire and nails. Reports are frequent of high-priced nails reaching the market through out-of-the-ordinary channels. There is great need for nails suitable for composition roofing. The upholstering trade is eagerly seeking tacks. It is anticipated that woven wire fence will be in exceptionally strong demand this spring. Instances are heard where poultry netting of 1½-inch mesh, No. 17 gage, is being utilized as a substitute for metal lath.

Birmingham—Pressure for wire products continues. Nails are exceedingly scarce again despite a recent temporary improvement. The same situation holds in wire fencing, especially barbed wire, and will grow progressively more stringent this spring. Jobbers parcel out their few rolls of wire cautiously. Wire processors receive only a fraction of needs.

Steel Bars . . .

Supply of large sizes improves but that of small sizes remains tight

Bar Prices, Page 122

New York—While there is an easing in the larger sizes, consumers of the small sizes of carbon bars report as much difficulty as ever in obtaining tonnage. Most of their suppliers are well behind on current promises and some trade leaders believe it will be at least another three months before there is an easing in the small specifications. This will apply they believe, not only to hot carbon bars but to cold-drawn carbon as well. Meanwhile, alloy bars continue in relatively easy supply, with some sellers in position to offer hot-alloy bars within four to five weeks.

Boston—Improvement in cold-drawn carbon bar supply is gradually working down into smaller sizes, but ⅝-inch and under are not included. Heavy demand for hot carbon bars in the latter sizes limits ability of cold finishing mills in reaching this range. Over 1-inch, some mills make six to eight weeks delivery on cold finished. Only alloys, stainless included, tool steel and larger cold-drawn carbon are available for second quarter by way of new orders; except for larger sizes, hot-rolled carbon quotas are closed at above the level of first quarter tonnage. Efforts to increase carbon bar allocations in wanted sizes have been generally unsuccessful. Both carbon and alloy bar extras are undergoing revisions but up to now application of former extras have not been uniform, notably as to killed and semikilled steel.

Philadelphia — A general modification of bar extras may come shortly as a result of changes announced last week by Carnegie-Illinois Steel Corp. Action by this interest came as a surprise to the trade and, until other producers have had an opportunity to study the changes fully, the scope of their action will not be definitely known.

While there first was an easing in demand on large sized hot carbon bars to be followed now by somewhat less pressure for the medium sizes, the cycle has not as yet spread to the small specifications and from the present outlook it will not for some time. Anything ¾-inch and under appears as scarce as ever, with consumers unable to get anywhere near the tonnage required. Cold drawn carbon bars generally are easier than hot bars. However, supply of cold carbon steel in the small sizes still falls far short of requirements.

Chicago—Earmarking of more steel to the freight car building program starting in April is certain to reduce quantities available to consumers. While few mills have made a move, it is regarded likely that some cutback in second quarter quotas will have to be made. Trimming of quotas would be quite severe were mill operations not up to 95 per cent of capacity. Demand, particularly for smaller sizes of carbon bars, is strong with cancellations almost nil.

St. Louis—Demand for merchant bars remains strong although some price resistance is showing up from consumer goods manufacturers. Makers of modernistic furniture involving steel bars and tubes, for example, are backing off from

The Steel Situation

THE adequacy of steel supplies is a subject of continued concern for both consumers and the steel industry itself. Many consumers unable to obtain steel, feel that capacity should be increased considerably. The steel industry, on the other hand, recalls vividly that 62 per cent of its capacity was idle during the five years beginning with 1930 and that 41 per cent was not used in the 5-year period ending with 1939.

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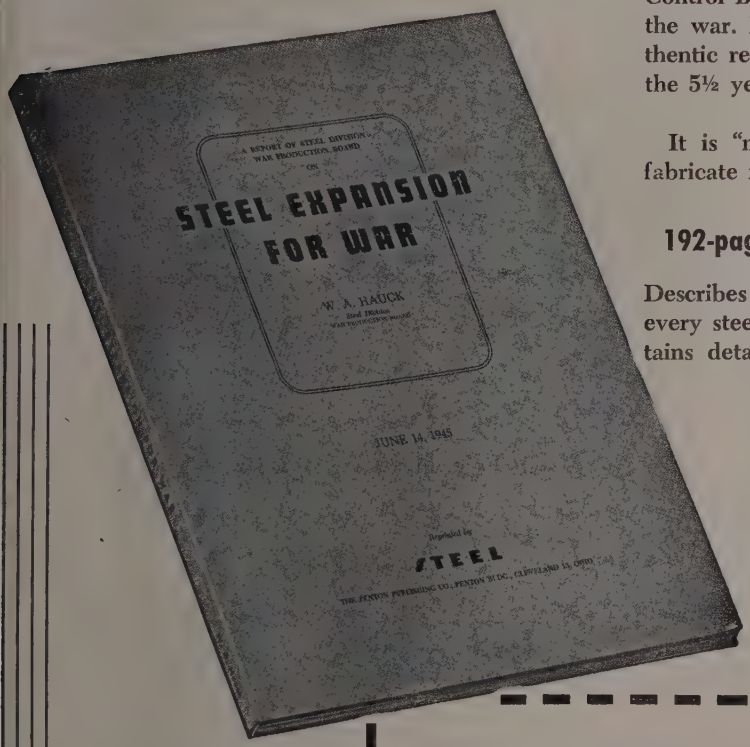

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steel prices in the face of retail customer resistance. Bar makers, therefore, predict a shift in demand without a change in tonnage. Shipments here average 1000 tons monthly and schedules are filled six months ahead.

Seattle — Substantial order backlogs for merchant bars remain static since new business about equals production. Demand continues at high levels.

Structural Shapes . . .

Structural Shape Prices, Page 123

Cleveland — Potential demand for structurals is heavy, although current bookings are rather light due to restrictions on construction, including government limitations, high costs and extended deliveries on building materials. Most fabricating shops, for instance, cannot accept any new work for delivery over the balance of this year. Public works projects are being held back, although a number of small jobs are up for bids at Columbus, O., Mar. 25, involving a comparatively small tonnage.

Boston — Inquiry for structural shape tonnage for highway bridges is far below normal for this season. Small spans in Connecticut and Massachusetts are taking close to 500 tons, bulk closing Mar. 31. Most state highway work involves federal aid and is subject to approval and delay. Despite high costs, structural steel demand holds fairly well. Based on current outlook for plain material, however, fabricating shops are more cautious in taking on new projects.

New York — Bethlehem Steel Co., Bethlehem, Pa., is low bidder for the second time on the 6600-ton structural shape inquiry for the veterans' hospital at Fort Hamilton, Brooklyn, N. Y. Specifications are now being issued for a veterans' hospital in South Orange, N. J., requiring a similar tonnage. Another sizable project in early prospect is a municipal truck terminal in lower New York.

Philadelphia — While structural buying is spotty, specifications are accumulating, with evidences that an increasing number of jobs will be released as soon as costs in the building field appear to have become stabilized. Meanwhile, some of the more urgent projects are going ahead. Most fabricators have several months' order backlogs, with operations restricted by difficulty in obtaining steel, especially plates.

Pittsburgh—New structural inquiries remain relatively light, reflecting extended mill deliveries and fact that fabricators are not in a position to take on much additional work because they too are far behind schedule on most jobs. Some headway is being made against these order backlogs, reflecting heavy mill shipments since first of the year despite occasional disruption to production schedules due to industrial gas shortage. Carnegie-Illinois Steel Corp. has completely revised the carbon chemical requirement extras for carbon shapes to coincide with changes recently established for carbon plates. New carbon bracket ranges have been established and corresponding extras reduced by 5 and 10 cents.

Chicago — Structural fabricators here are obliged to limit bookings to keep in balance with receipts of plain material. Gradually rising steelmaking operations had given hope of increased steel quotas in second quarter, but this optimism has been dashed now that more structurals must be channeled into the expanded freight car construction program. Plight of fabricators has been aggravated by the withdrawal from this district by an Eastern shape producer which formerly had been an important supplier. Growing scarcity of steel is causing postponement or withdrawal of numerous construction jobs.

Birmingham—Structural demand continues relatively light. Certification by CPA, however, continues fairly heavy with indicated structural activity on a magnified scale for the next few months. Currently, inquiries are not nearly so great as they were in the first few weeks of peace.

Seattle — Fabricators are unable to bid on many substantial contracts due to continued scarcity of materials. Mill allocations are inadequate and shipments are behind schedule. Many small jobs, involving 30 to 50 tons, are being booked but projects involving larger tonnages are hard to place. Steel inventories are extremely low.

Plates . . .

Plate Prices, Page 123

Philadelphia — Most district plate mills continue to operate at well under normal capacity because of inability to obtain an adequate supply of scrap and pig iron, particularly pig iron. This situation may improve over the next several weeks as the flow of scrap is expected to increase. Plate producers generally are already using a far greater proportion of scrap than they normally do, and scrap that doesn't measure up to normal standards. All this has kept the rate of melt below what could be expected were a normal mixture available. There is little prospect of any material gain in pig iron shipments here over the next several weeks. Plate mills selling on a quarterly quota basis are tied up for the second quarter and not selling beyond; those who are not on such a basis have already booked themselves so far ahead that they are refusing to accept additional orders. As it stands, all producers will enter the second quarter with heavy arrearages.

Meanwhile, much interest is being focused on the action of the leading producer in easing extras on plates. While other producers have not as yet had an opportunity to fully study the details of these revisions, it appears likely that they will adopt them in one degree or another.

Boston—Overload on plate mills is emphasized by freight car requirements and substantial buying by railroads for repairs and shop needs; some allotments to fabricators are being reduced and delinquent tonnage eliminated for second quarter. Tonnage for that period is below requirements for numerous shops and consumers in most cases are unable to place third quarter volume. Light plates are shortest in supply, notably welding quality for tank building. Warehouse stocks of light plates are depleted and fill-in buying to round out requirements is sharply restricted. Distributors are unable to place tonnage orders until carryovers are reduced; with plate mill production retarded this is slow.

New York—Plate consumers continue to have difficulty placing tonnage. Current requirements of most buyers are partly covered by orders already on schedule with the mills; however, requirements generally far exceed any tonnage they are likely to receive for some time against these orders. Over recent weeks, some have had their orders scaled down by the mills.

Chicago—Platemakers report no lessening in demand for plates, all consumers taking their full quotas and seeking more. Output of tank fabricators, pipemakers and heavy machinery manufacturers is limited only by receipts of steel. Start of the expanded freight car building program in April and continuing through the year will necessitate diversion of mill output away from general fabricators. One platemaker is increasing the price of plate wasters from 65 to 75 per cent of prime prices to keep this item above the price of scrap.

Birmingham—Plates continue in tight supply, although production is estimated at 80 per cent or better. Floor plates are in considerable demand and backlogs are little, if any, less than they were at the close of the year.

Seattle—Plates continue in good demand but local shops report difficulty in obtaining supplies. There is a steady flow of business in small tonnages for tanks and boilers.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 122

Pittsburgh — Carnegie-Illinois Steel Corp. has revised size extras for concrete reinforcing rounds and squares for mill or fabricating shop delivery, effective on shipments Mar. 19. The new size extra for squares is 10 cents compared with 15 cents per 100 pounds for full range of sizes. A reduction of 5 cents to 10 cents was put into effect on size extras for 1-inch rounds. However, increases have been established for small sized rounds as follows: ½ and ⅝-inch, up 5 cents to 35 and 55 cents, respectively; ¼-inch, up 10 cents to $1.30.

Mill shipments remain under strict allocation with demand far in excess of output. Further increase in overall requirements is likely in the second quarter, reflecting anticipated easing in non-housing construction restrictions.

Cleveland—Arbitrary delivered prices to Detroit, Toledo and eastern Michigan are no longer being used by the leading mills as the pricing basis on reinforcing bars. Reinforcing bars to these points are priced at the Cleveland base plus actual freight charge. Although demand is still in excess of supply, pressure has eased somewhat due to checks on construction, including government limitations, high costs and extended deliveries on materials.

Seattle — Demand for reinforcing bars continues active with new bookings about equaling production. No headway is being made toward reduction in unfilled business. Several major reinforcing tonnages are pending.

Rails, Cars . . .

Track Material Prices, Page 123

New York—Freight car builders have advised the Office of Defense Transportation that they can produce more than 10,000 cars a month by July. At a recent meeting with government officials they submitted a production schedule calling for 4000 cars in March; 5800 in April; 7100 in May; 9800 in June and more than 10,000 in July.

Tubular Goods . . .

Tubular Goods Prices, Page 123

Boston—Except for stainless and a limited number of alloys, tubing producers are sold through 1947. Electric welded tubing backlogs are heavier with deliveries more extended. Users changed specifications to welded stock last year and this, coupled with lack of strip in some instances, has filled mill schedules. Demand for merchant steel pipe is strong and allocations to distributors are barely met. But one mill bid on part of 250 tons, small steel pipe, Springfield arsenal; this, by Wheatland Tube Co., Philadelphia, was rejected.

St. Louis—Already intense pressure for pipe is increasing with the approach of better building weather, pipe schedules are filled eight to nine months ahead and most new orders are being refused. Pressure for residential pipe has been especially strong, but a downturn is foreseen soon due to resistance to home building costs. Commercial building, bridge and road work, however, promise to leave general demand unabated.

Seattle — Cast iron pipe agencies are handicapped by mill shortages and extended deliveries, some running into 1949. Demand continues strong and several major projects pend.

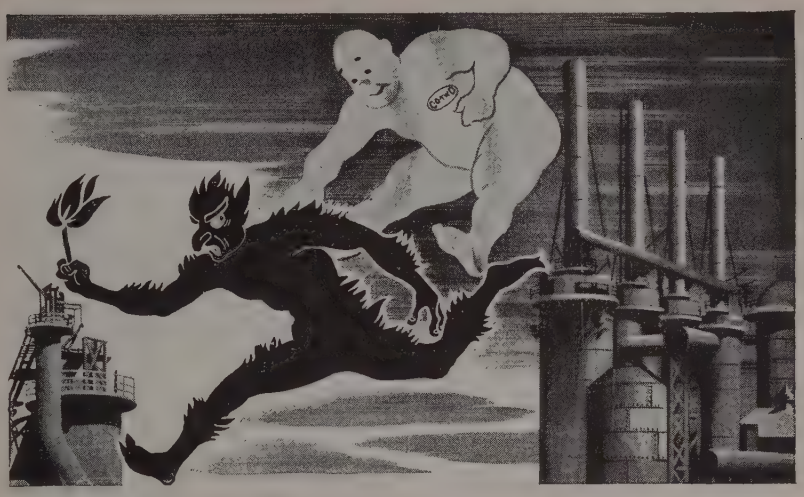
Pig Iron . . .

Pig Iron Prices, Page 124

Boston — Substantial sales of Texas pig iron have been made in New England with shipments to start in May. This will be costly iron, around $69 delivered, unless a lower commodity rate is secured. For a time, at least, melters of foundry grades in this area are not only paying the lowest price, $29.50, Everett, but also the highest when forced to bring in tonnage from outside sources. Shipments from Buffalo and Pennsylvania are down and the district furnace carries bulk of the load with malleable short at some foundries. One shop has returned patterns to an important customer, being unable to get the required malleable grade. Status of additional foreign iron is uncertain; last was imported by a Marblehead, Mass., scrap dealer. Users of basic are hard-pressed to maintain operations; various aids to bolster supply to foundry melters do not apply to basic. Major supply and price problem looms by the end of next quarter, when the Mystic plan is due to expire. If it does, one of the sharpest increases in many years for Mystic tonnage is likely.

Philadelphia—While less tonnage will be set aside for the housing program in the second quarter, district pig iron consumers generally will continue to experience a marked shortage of iron throughout most, if not all, of that period. However, there will be a more equitable distribution, in sharp contrast with the quarter now closing, when in the case of one producer, for instance, only 10 per cent of his output was available to two-thirds of his regular customers.

Buffalo—Merchant pig iron moved to consumers in better volume last week as producers reported temporary improvement in the railroad car situation. Trade authorities, however, emphasized that foundries planning to increase production without assuring adequate supplies of pig iron, fuel and scrap were piling up grief for themselves. With prices



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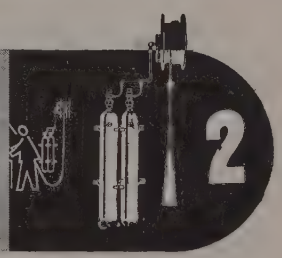

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quoted on a day-to-day basis, it was pointed out also that costs of raw materials could increase overnight.

Cincinnati—Pig iron shipments have shown no recent improvement, although all melters are asking for greater tonnages. Proportion of pig and scrap is mainly a question of supplies, recent price increases having no influence. Backlogs of foundries are extended.

Chicago — Foundries continue to press pig iron producers and sellers for increased quotas, feeling that announced end of allocations, except for soil pipe, will make more tonnage available. Suppliers feel that only increased production of pig iron can make larger quotas possible, and bigger production is not in the immediate picture here. Of three furnaces idle here, two are undergoing reconstruction and one is not in good condition. Shortage of steelmaking scrap forces steel mills to draw heavily on hot metal to sustain steelmaking operations.

Birmingham—Blast furnace interests declare not the slightest dent is evident in the terrific demand for iron from foundries, pipe shops and miscellaneous industries in this territory. The recent price advance was expected by iron users and the scramble for iron is unabated.

Iron Ore Consumption and Stocks Decline in February

Cleveland — Lake Superior iron ore consumption eased slightly in February to 6,264,284 gross tons from 7,023,856 in January, making the total for the first two months 13,288,140 tons compared with 5,467,427 in the like 1946 period when consumption was curtailed due to the steelworkers strike. Stocks of ore on Lake Erie docks and at furnaces totaled 24,316,980 tons as of Mar. 1 compared with 30,514,072 a month ago and 33,647,260 a year ago, according to the Lake Superior Iron Ore Association, this city.

Iron Ore . . .

Iron Ore Prices, Page 124

Cleveland—Contracts covering transportation of iron ore and coal for the 1947 season have been made by two of the largest Great Lakes vessel operators, providing for rates which average about 11 per cent higher than those for last season. The rates per gross ton of ore agreed upon under these contracts are net to boat: Head of lakes to all lower lake ports, $1; Marquette to all lower lake ports, 90 cents; Escanaba to Lake Erie ports, 75 cents; Escanaba to Chicago district, 60 cents.

Effective Apr. 1, unloading charge has been increased 1 cent per ton to 15.00 cents for lifting ore from hold to rail of vessel.

The rates per net ton of coal for the 1947 season are: Lake Superior, 57 cents; Lake Michigan, north of Milwaukee, 62 cents; Milwaukee and Chicago districts, 68 cents.

Chicago—Demanding an increase in pay of 25 per cent for Great Lakes sailors, the National Maritime Union (CIO) has scheduled negotiations with shipping companies here beginning this week. Companies involved are: Inland Steel Co., operating five ore and package freighters; International Harvester Co., two freighters; Standard Oil Co. of Indiana, five tankers. They employ about 325 sailors.

Scrap . . .

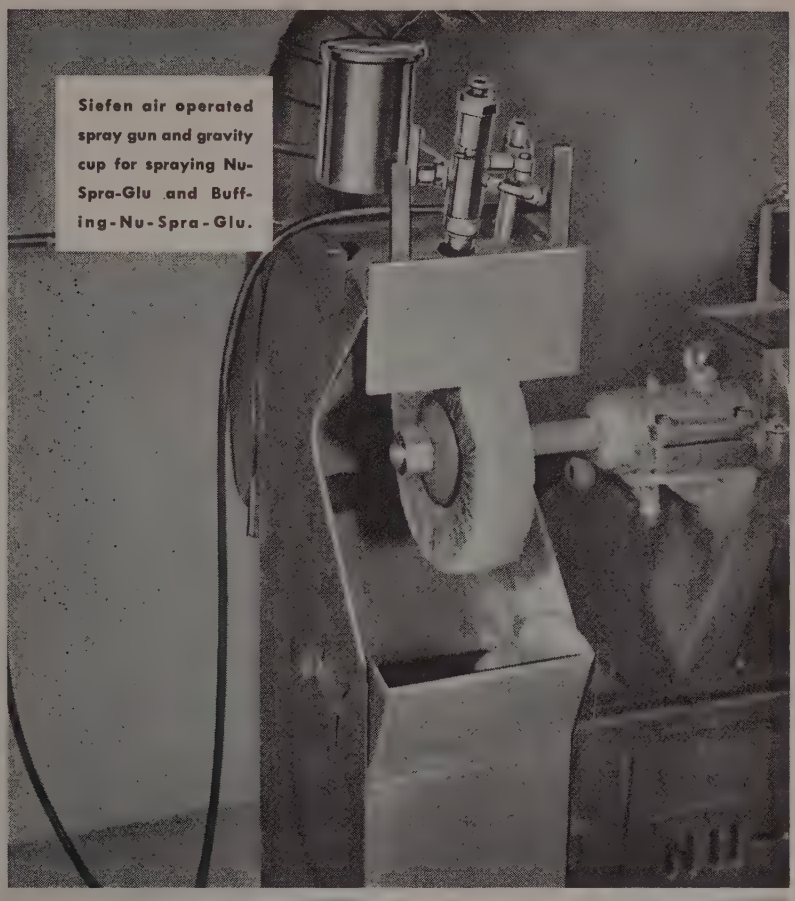
Market leveling off as buying resistance spreads . . . Shipments increase

Scrap Prices, Page 128

Philadelphia — While cast grades continue strong, the steel scrap market is leveling off. No. 1 and No. 2 heavy melting steel, No. 1 busheling, No. 1 and No. 2 bundles are now holding at $40, delivered, and No. 3 bundles at $36. Buying of heavy melting steel has been light recently, most consumers coasting along on shipments against old contracts. In general, shipments have been heavier, reflecting improved weather conditions, and certain mills have begun to accumulate inventory for the first time this winter. With spring now here, indications point to a further improvement in the flow of scrap. No. 1 cupola cast is quoted $50 to $52, delivered; charging box cast and heavy breakable, $47 to $47.50; clean auto cast, $50 to $52. Unstripped motor blocks, malleable and No. 1 steels are unchanged. Continued shortage of pig iron, combined with a fundamental shortage of material, ascribed primarily to limited demolition work, provides little hope of any appreciable easing in cupola cast for the present.

New York — Upward trend in steelmaking grades is losing its force. Whereas a week ago New York brokers were offering $36.50 to $37, fob shipping point, they are now paying $37 but no higher. This price applies to No. 1 and No. 2 heavy melting steel, No. 1 busheling and Nos. 1 and 2 bundles. No. 3 bundles are only slightly higher at $35. Low phosphorous grades show some weakness, with punchings, plate scrap, and cut structurals now holding at $38.50 to $39, and electric furnace bundles at $38. Cast grades show continued strength with No. 1 cupola cast being quoted $45.50 to $46, and charging box cast and unstripped motor blocks at $43 to $43.50. No little amount of unstripped motor blocks are being worked in with No. 1 cupola cast, but in solid carlots this material is moving at the $43 to $43.50 spread. Extreme scarcity of malleable has forced brokers' buying prices up to a spread of $48 to $49, an increase of $3 within a few days. Machine shop turnings and mixed borings and turnings are unchanged at $27.50 and short shovel turnings at $29.50. Through error, these three grades were quoted in the 30s last week instead of the 20s.

Boston — Firmer resistance to rising steel scrap prices has developed; some melters threaten to close before paying more for scrap. When heavy melting reached $36, price was $11 a ton over the temporary stabilization after decontrol. Admittedly this sharp advance has brought out more scrap. Because of shortage of metallics, open hearth operators are resorting to every known practice to stretch out supplies, graphite for carbon and other innovations. Sum total is usually longer melts. Several steel grades, including turnings, have not followed the increase in heavy melting to normal differential levels. Cast has performed less sensationally, but prices hold firm, bulk of this grade going from $42 to $45 delivered. There is also considerable grumbling as to the quality of castings; because of hardness, heat treating is sometimes required before they



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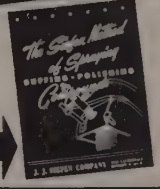

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can be machined. After textile and shoe machinery shops are covered, frequently by turn-in of replaced machines, supply of cast for other consumers is limited.

Pittsburgh — Definite consumer resistance is developing here to current high scrap prices. Jones & Laughlin Steel Corp., Pittsburgh Steel Co., Crucible Steel Co. of America, and Wheeling Steel Corp. are reportedly out of the market. Scrap dealers and brokers look for a substantial increase in movement of material this spring which would have a dampening effect on the upward price trend. There is a definite feeling that prices will react in the near future, particularly in view of an increase in overall supplies with the advent of warmer weather.

Cleveland—Mills report heavy receipts of scrap and fairly comfortable position regarding supplies for current operations, although little progress is being made in replenishing reserve stocks. Prices remained firm last week on basis of $37.50 for No. 1 heavy melting steel. A railroad embargo on shipments of scrap to a steel mill in the valley went into effect Mar. 12 and will remain in effect until the cars tied up at the plant are reduced to a lower number. An exception to the embargo are shipments moving to the plant under permits issued by the Association of American Railroads. Shipments of foundry grades of scrap have shown very little improvement and prices remain firm at $40 to $45 for low phos. If the present mild weather continues, an easier price tone is expected by some trade interests to develop early in April.

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Buffalo—Price advance of $5 to $6 a ton swept through the scrap market last week on spirited competitive bidding for available supplies. The sharp upswing started when mills boosted the price for local offerings $2.50 a ton, placing heavy melting steel and No. 1 bundles at $37.50 a ton, equal to the figure being paid for supplies coming from beyond Rochester. This was followed by a further increase to $40-41 a ton by one of the leading mill consumers. The latest boost was a move to halt the flow of scrap to other districts. Substantial sales have been reported recently in other sections of the state to Pennsylvania and Valley consumers. Sales at the higher figure threw the entire market into turmoil. Some consumers said they would refuse to go along with such prices, even though they were the going ranges on present business.

Detroit — A frenzied scrap market, beset by pressure from all sides, and buzzing with wild rumors of "silly" prices, scrap-for-steel trades, government investigations and whatnot, actually is holding about even as far as prices being paid by larger old-line mill consumers, most of whom at present are sitting tight. Instances could be cited of sales at several dollars higher than currently quoted figures, but they are not representative. Reports are heard that scrap is becoming fairly plentiful on the West Coast and in the Southwest, leading to speculation that a wave of easiness may be spreading across the country from west to east. Attention is focused for the time being on the Chicago market for a possible emergence of the trend there.

Cincinnati—Prices of iron and steel scrap moved higher here last week to the basis of $37 for heavy melting steel. Major district melters are fairly well stocked, however, and some resistance points have developed. In contrast, other melters are accepting scrap from shippers in Florida, Texas and other remote points on which they pay big freight charges.

Chicago — Prices for scrap are holding steady here at the recently advanced level of $36 for open-hearth grades, and volume of flow is better than for some weeks. While price is having some favorable influence on volume, it is believed that nicer weather and expanded production of scrap by virtue of high-level steel shipments from mills are more responsible. Consumers and dealers alike feel that the present scrap price is too high and that the increases came too fast to be healthy. For this reason, further advances seem unlikely now—in fact, leveling off would not be unexpected. Scrap is being consumed in heaviest volume here since before V-J Day in August, 1945, with steelmaking operations hitting 95 per cent of capacity.

Washington — Bids have been asked from American steel companies on a total of 188,000 tons of Army-generated scrap, accumulated in Germany and other European areas awaiting shipment. Bids asked this month cover 150,000 tons at Bremerhaven, Germany, and 8000 tons in Austria. Bids due Apr. 2 will cover 30,000 additional tons in Austria. Steel representatives met last week with congressional committee groups to develop a plan to reimburse the Army, enabling the Army to move scrap to the United States. This is not battlefield scrap, but Army scrap described as vehicles, etc. American military government also is re-

ported to have accumulated some scrap, but is trading this to Scandinavian mills engaged in producing certain Army contract items.

Birmingham—Scrap prices skyrocketed again last week to new highs. Heavy melting at $36 led the parade with most grades advancing proportionately. All interests are shaking their heads in perplexity as each new advance brings out a moderate tonnage of new scrap.

St. Louis—Scrap shipments are improving under stimulus of higher prices posted a week ago. Melters are bought up until April 1. Mill reserves are two to three weeks; those of foundries, 30 to 45 days. Foundries improved their position by use of rail specialties at prices mills declined to pay. One melter complains that purchase by a gas utility of 16,000 tons of cast and steel scrap at premium prices in order to rush completion of a 100-mile pipeline project upset the local scrap price and supply situation. Heavy melting is in sharp demand. Rail offerings have been scarce but improvement is expected next month.

Seattle — Situation in scrap continues unsatisfactory. Receipts increased last week, however, from the desperately low level in the previous period. Ship breaking has not got into volume production. Mill buyers state the bottleneck is in the lack of ships for breaking. Criticism is leveled at government agencies which are slow in offering hulls for dismantling in this area. Automobile scrap has not been available here since the start of the war. More than 20 per cent of scrap used by steel mills prior to the war came from used cars and used farm machinery. These sources have been dried up for several years. Announcement of the Army's plans to transport scrap equipment from Japan and Germany is of interest to local steel mills. The Port of Portland, Oreg., has offered WAA $250,000 for surplus government facilities at Swan Island. Two steel salvage firms, Dulien Steel Products Inc., Seattle, and Barde Steel Co., Portland, each have offered about $1 million for the same facilities. The latter two firms are understood to be planning large ship breaking plants.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 124

Cleveland — Supply of by-product foundry coke has tightened in this district. Although ovens are being operated at capacity, the quality of coking coal being received is poor and output is not sufficient to cover demand fully. Consumers' stocks are low, averaging only between 2 to 10 days' needs. Producers are shipping to regular customers on a month-to-month basis but the movement has been delayed occasionally by a shortage of container cars.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 123

Cleveland — Lack of raw material continues to stymie local bolt and nut manufacturers who report growing order backlogs and extended delivery dates. Production and consequent delivery of steel for fastener producers was delayed by the gas shortage, and the loss of production is still felt keenly. One manufacturer here reports his steel source produced material for him in only five days in February.

Warehouse . . .

Warehouse Prices, Page 125

New York—Less tonnage on products in heaviest demand confronts warehouses next quarter. This includes carbon flat-rolled, structurals, plates, small bars and wire. One structural producer has eliminated warehouse quotas for April in an effort to catch up on delinquent tonnage. Distributors have less firm orders on mill books for next quarter covering most active products. Meanwhile with inventories becoming more unbalanced, demand on warehouses for steel remains at high levels.

Pittsburgh—Release of new warehouse stock price books have been delayed by substantial revision in size treatment and chemistry extras announced last week by Carnegie-Illinois Steel Corp. on several products. Experience of distributors in revising specifications to avoid packaging, quantity and dead length extras has worked out satisfactorily to date. Distributors' inventories continue wholly inadequate to meet present heavy demand, particularly in light gage flat-rolled steel, small bar sizes, wire and tubing products. Alloys and stainless are in good supply. Despite indicated record breaking peacetime finished steel production next quarter, scheduled mill shipments to warehouses probably will register little change in that period. Downward trend in warehouse steel inventories is not expected to be reversed until final quarter this year.

Philadelphia — Easing of extras on a number of products by the leading producer last week, with the likelihood that the action will spread, came at a time when some district jobbers had just com-

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pleted publication of new price lists, to take the place of tentative schedules issued over recent years. These new lists now will have to be revised. Demand upon jobbers continues heavy, especially for plates and the light flat products, with sales limited by inability of distributors to lay in larger stocks. On some of these flat items warehouse floors are swept clean most of the time.

Cleveland — Some jobbers report slight improvement in supply, although smaller sizes continue critically tight. In carbon bars, scarcest items are ⅝-inch and under with deliveries extending into 1948; in alloy grades, 1 inch and smaller are in shortest supply. Welded tubing continues scarce because of strip shortage, and consumers are turning to seamless tubing, aggravating its shortage. One structural jobber reports mill will ship his allocation in only one month in third quarter. Carbuilding program is blamed for his reduction of receipts to only one-sixth of requirements.

Cincinnati — Some of the warehouse stocks in this district are lowest ever, mill shipments of scarce items going out quickly and leaving inventories unbalanced. Demand for structurals is off, in comparison to last year, due to deferment of major projects.

Chicago—Although mill shipments of steel to warehouses is continuing at a high rate, consumers find it difficult to obtain their requirements from this source. Overall demand is holding at high level and on several products the steel is unloaded from cars and dispatched to customers without being transferred to inventory. Alloy products are in reasonably good supply, but substantial shortages exist in all flat-rolled items, small carbon bars, and light structurals.

Seattle — Jobbing houses report a steady turnover, volume maintaining a rate equal to that of a year ago. All items are in active demand but conditions militate against inventory replenishment. Sheets are still the most critical item, no relief being expected until late in the year.

Tin Plate . . .

Tin Plate Prices, Page 123

Pittsburgh—Restricted supply of pig tin apparently necessitates continuation of tin coating controls for some time. Legal status of Civilian Production Administration's second quarter export directive tonnage is being questioned. There is no doubt scheduled export load is cutting sharply into an inadequate supply for domestic requirements and this situation will be accentuated as seasonal needs for food pack program gets underway. Tin plate demand for general line cans will far exceed supply throughout remainder of this year. Container manufacturers' inventory of tin plate is well below normal, requiring strict allocation of their container output. Critical shortage of box cars and trucks continues to adversely affect smooth flow of tin mill products to consumers.

The Justice Department has approved RFC's sale of two electrolytic tin plate lines at Aliquippa, Pa., to Jones & Laughlin Steel Corp. The facilities, built during the war at a cost of $2.8 million, were sold for $1.2 million.

Ferroalloys . . .

Ferroalloy Prices, Page 125

Canton, O.—Ohio Ferro-Alloys Corp. has advanced prices, effective Apr. 1, on simanal and ferrosilicon, ferromanganese and ferrochrome briquets. New prices per pound of alloy, fob works, with freight allowed not exceeding St. Louis rate, are as follows: Simanal (Approximately 20% each of silicon, managanese, and aluminum with balance iron), lump, bulk, carload, 9.00c; packed, carload 9.50c, ton lots 9.75c, less than ton lots 10.25c.

Briquets are quoted in cents per pound of contained silicon, manganese or chromium, fob plant with freight allowed to destination, in the eastern zone, as follows: Ferrosilicon, carload, bulk 10.25c packed 11.75c; 2000 lb to carload, bulk, 11.25c, packed 12.75c; less than 2000 lb, packed 13.75c.

Ferromanganese, carload, bulk 10.50c, packed 11,80c; 2000 lb to carload 11.70c, packed 12.80c; less than 2000 lb, packed, 13.80c.

Ferrochrome, carload, bulk 17.16c, packed 17.45c; 2000 lb to carload, bulk 17.60c, packed 18.15c; less than 2000 lb, packed 18.80c.

New York—The leading eastern producer has advanced spiegeleisen $4 a ton, effective Mar. 15. Under the new schedule 16-19 per cent material is now holding at $43 per gross ton, in carlots, Palmerton, Pa.; 19-21 per cent (1-3 per cent silicon) $44.; 19-21 per cent (4 per cent silicon) $46; and 26-28 per cent $53.50.

Electro Metallurgical Sales Corp., made the following price increases which were effective Mar. 6 on a spot basis and Apr. 1 for contract users (See STEEL, Mar. 10, p. 154):

Specific increases in the silicon alloys

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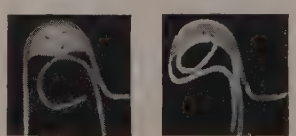

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—eastern zone, carload, lump, bulk—are as follows: 50 per cent ferrosilicon, old price 7.50c per lb of contained silicon, new price 7.80c; low-aluminum 65 per cent, old price 9.65c, new price 10.30c; 75 per cent, old price 9.25c, new price 10.00c; 85 per cent, old price 10.45c, new price 11.30c; 90 per cent, old price 12.05c new price 12.80c. Corresponding increases apply in the low-aluminum grades of 50 per cent, 75 per cent, 85 per cent and 90 per cent ferrosilicon. All grades silicon metal are increased 0.85c per lb of contained silicon, making the new base price for the regular 1.00 per cent iron grade 14.50c.

Silicon briquets are up 0.4-cent, making the new price 4.10c per lb, ferromanganese and silicomanganese briquets are up 0.6-cent, making the new price 7.00c and 6.75c per lb, respectively.

In the various grades of low carbon ferrochromium, the base price of only the maximum 0.20 per cent carbon grade and higher are revised.

The maximum 0.20 per cent carbon grade is up ¼-cent to 21.75c per lb contained chromium, 0.50 per cent carbon up ½-cent to 21.50c, 1 per cent carbon up ½-cent to 21.00c, and 2 per cent carbon up 1-cent to 20.50c. "SM" low-carbon ferrochromium continues at ½-cent above the 2 per cent carbon grade. According to the company, these are the first changes in the base prices of low-carbon ferrochromium since October, 1941, and the increases range from 1.2 to 5.1 per cent.

Among the various manganese alloys for steel making, only silicomanganese is affected by this price revision. The new price is 6.65c per lb of alloy, an increase of 0.2-cent or 3.1 per cent.

Substantially higher costs of ore and scrap make increases in the zirconium alloys mandatory, a company spokesman stated. The 12 to 15 per cent grade goes from 4.85c to 5.50c per lb of alloy, and the 35 to 40 per cent grade from 14.50c to 17.00c per lb.

The new prices for some miscellaneous alloys are as follows: "SMZ" alloy 13.50c a lb; "CMSZ" alloys 14.50c per lb; manganese-nickel-titanium $2.25 per lb; and calcium-silicon 14c per lb.

In addition to the flat increases indicated above, each applying to all quantities and sizes in all zones, there will be an increase of about $5.00 per net ton for packing all grades of low-carbon ferrochromium and an increase of about $2.00 per ton for packing all other materials to which price increases apply. This is in order to make the packing differentials more nearly reflect current higher packing costs. No increases are being made in the high-carbon ferrochromium alloys, standard, medium and low-carbon ferromanganeses, calcium metal, ferrocolumbium and the vanadium and titanium alloys.

Refractories . . .

Refractories Prices, Page 124

Washington—Fireclay refractory shipments by manufacturers in 1945 were valued at $66.1 million while shipments of nonclay refractories (exclusive of refractory magnesia and dead-burned dolomite) were valued at $59.7 million, representing increases of about 64 per cent and 124 per cent, respectively, since 1939. These figures constitute the first comprehensive statistics on output of refractories in the United States since before the war. Increases in value of products produced between 1939 and 1945 were as follows: Ladle brick, 222 per cent, graphite and other carbon crucibles and retorts, 217 per cent; and special refractories of such nonclay materials as silicon carbide, fused alumina, and mix mullite, about 230 per cent. Shipments of most of the refractories in 1945 were at a lower level, however, than during such war years as 1942 and 1943.

Semifinished Steel . . .

Semifinished Prices, Page 122

Pittsburgh—No letup in tight supply of semifinished steel is indicated through the first half. One midwestern mill is reported to be obtaining $90 to $95 per ton for rerolling ingots, some of which tonnage is scheduled for export. A number of rerolling carbon steel ingot transactions have been made on basis of conversion cost plus value of scrap charged, with some customers forced to furnish the scrap.

Carbon extra on forging and rerolling billets has been increased by Carnegie-Illinois Steel Corp. from $1 to $2 for range 0.28 to 0.60 per cent maximum. The silicon extras on rerolling billets for carbon specifications 0.28 per cent and under have been reduced from $5 to $3 per ton. The former $2 silicon extra has been discontinued for carbon specifications over 0.28 maximum.

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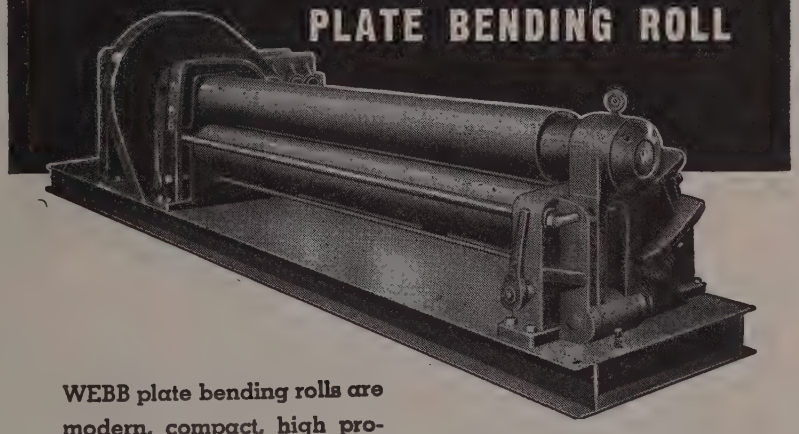

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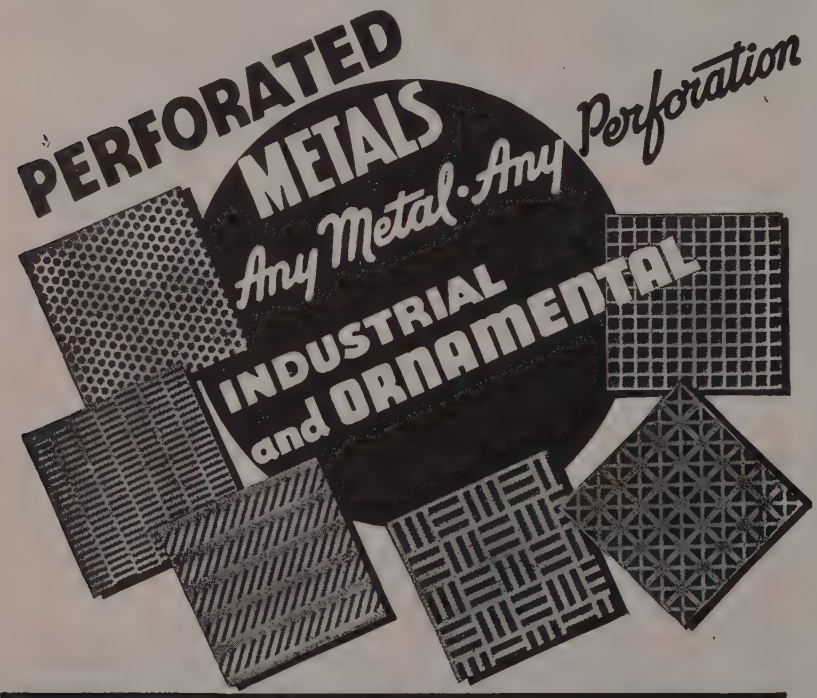

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Canada . . .

Toronto, Ont.—While there has been little easing in steel sheet supply, there will be some increase in quota allotments for second quarter. On both black and galvanized sheets, mills are not seeking new business, books being filled to the end of June. Substantial carryover of unfilled orders likely will be carried into third quarter.

Demand for plates is moving ahead steadily and should reach peak load about the first of July, when shipbuilders swing into full operation on the French orders. Railroad car and locomotive builders also have backlogs sufficient to maintain capacity operations to the end of this year. Canadian Pacific railroad will require expenditure of about $75 million on rolling stock replacements during the next two or three years. Heavy buying by the Canadian National railroad also is in prospect. Plate mills are taking orders for delivery in about two months, but no surplus stocks are reported.

Demand for carbon bars continues heavy with no improvement in supply. A large part of recent placements has been for smaller sizes. While some barmakers continue to accept orders for second quarter delivery, others have withdrawn from the market for this period, but are accepting orders for third quarter. No shortage of alloy bars is reported.

Demand for wire and nails is far in excess of supply with no indication of easing.

Merchant pig iron sales continue at a steady weekly rate of about 10,000 tons. Shortage of scrap has created a sharp increase in demand for pig iron in foundry melting operations. While producers are accepting new orders for pig iron, they are not taking big tonnages for immediate delivery, but are feeding out supplies in lots of 50 to 200 tons.

In the scrap market, business was at a standstill in early March. All movement of scrap from outside points was shut off due to heavy snow which blocked most roads throughout Ontario and Quebec and brought rail and truck transportation to a halt. Some local dealers received no scrap in their yards for over two weeks. The scrap shortage in Canada is acute and there is little prospect of domestic supply meeting demands for many months into the future, and with the United States source eliminated due to high prices, Canadian consumers and brokers are turning to Europe and Great Britain as a possible source of supply.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3655 tons, piling, including 2847 tons sheet piling and 808 tons bearing piling, cont. No. 1, Northerly Island Airport, Chicago, for city, to Carnegie-Illinois Steel Corp.; bids Feb. 13.

3100 tons, field house, University of Kentucky, Lexington, Ky., to Midland Structural Steel Co., Cicero, Ill., for fabrication by Allied Structural Steel Cos., Chicago; bids Mar. 11.

2000 tons, Army barracks, Alaska project, to Bethlehem Pacific Coast Steel Corp., Seattle.

1800 tons, women's dormitory, Penn State College, to Bethlehem Steel Co., Bethlehem, Pa.

1430 tons, power plant, Virginia Electric & Power Co., Quantico, Va., to Bethlehem Steel Co., Bethlehem, Pa.; Stone & Webster Engineering Corp., Boston, contractor-engineer.

700 tons, warehouse, United States Rubber Co., Fort Wayne, Ind., to Ingalls Iron Works Co., Birmingham.

500 tons, docking for St. Louis river drawbridge, Oliver, Wis., for Duluth, Missabe & Iron Range Railroad, to American Bridge Co., Pittsburgh.

350 tons, highway bridge, Fort Gibson, Miss., for state, to Virginia Bridge Co., Roanoke, Va.

270 tons, highway bridge, Dallas, Tex., for state, to Virginia Bridge Co., Roanoke, Va.

175 tons, trash racks for Coulee dam project, to Joshua Hendy Iron Works, Sunnyvale, Calif.

130 tons, warehouse, Indianapolis, for J. I. Case Co., to Hetherington & Berner Inc., Indianapolis.

Unstated, machine shop roof, Coulee project, to Worden-Allen Co., Milwaukee, low $27,200.

Unstated, 20-ton traveling crane, Coulee warehouse, to Judson-Pacific Co., San Francisco, low $19,171.

STRUCTURAL STEEL PENDING

6600 tons, veterans' hospital, Fort Hamilton, Brooklyn, N. Y.; Bethlehem Steel Co., Bethlehem, Pa., low.

6600 tons, veterans' hospital, South Orange, N. J.

5200 tons, viaduct, K St., Washington; bids closed Mar. 20.

3400 tons, grade separations and bridges, Cook county, Ill.; bids Mar. 19.

2009 tons, superstructure, 700-foot bridge, double leaf bascule span and six fixed spans, Passaic river, Clifton-Rutherford, N. J.; bids Apr. 9, Spencer Miller Jr., state highway commissioner, Trenton. Work also includes 123 tons, operating and lock machinery; 84 tons, trunnions and trunnion bearings, and 12,560 square feet, roadway and sidewalk grating.

1000 tons, building, Sterling Laboratories, Renssalear, N. Y.; new bids asked.

900 tons, public school 26, Queens, Long Island; John Kennedy & Sons, New York, low on general contract.

900 tons, 18-story Marcus Brown apartment, 70th St. and Park Ave., New York, bids asked.

613 tons, miscellaneous structural steel, for Department of Public Works, Chicago; bids Mar. 7, none submitted.

600 tons, plant, Circle Wire & Cable Co., Maspeth, Long Island, bids asked.

405 tons, railroad grade separation, W2V-F, Fayette county, Ill., for State Highways Division; bids of Feb. 7 and Feb. 28 rejected, new bids Mar. 28.

325 tons, bridges, East Hartford (two) and Manchester, Conn.; bids Mar 31, state highway commissioner, Hartford.

100 tons, Johnson & Johnson plant, Metuchen, N. J.

REINFORCING BARS . . .

REINFORCING BARS PLACED

400 tons, women's residence hall, University of Illinois, Urbana, Ill., to Truscon Steel Co., Youngstown, O.; Warner Construction Co. Inc., Chicago, contractor; bids Dec. 6.

200 tons, tunnel, University of Illinois, Urbana, Ill., to Joseph T. Ryerson & Son Inc., Chicago; Warner Construction Co. Inc., Chicago, contractor; bids Jan. 6.

130 tons, Washington state bridge at Dryden, to Northwest Steel Rolling Mills, Seattle.

REINFORCING BARS PENDING

2000 tons, including 1700 tons bars and 300 tons wire mesh, bridges and highway construction, Cook county, Ill.; bids Mar. 19.

216 tons, superstructure, 700-foot double leaf bascule bridge, Clifton-Rutherford, N. J.; bids Apr 9, Spencer Miller Jr., state highway commissioner, Trenton.

175 tons, also 560 tons bar joists, housing project, Bellwood, Ill.; bids Mar. 14.

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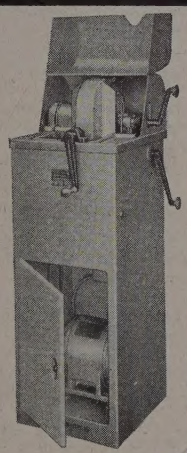

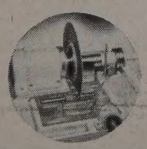

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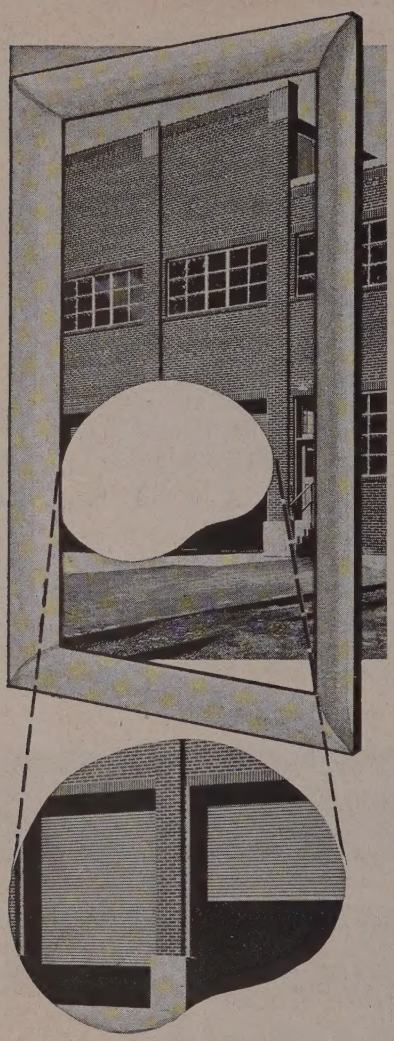

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You can be sure of fullest efficiency at every doorway when you install Kinnear Rolling Doors. Their coiling upward action saves floor and wall space. The doors remain out of the way and safe from damage when opened. All-steel construction brings extra protection and longer life. For added speed and convenience, motor operation may be incorporated, with any number of extra control stations at remote points. Write for details on Kinnear Rolling Doors.

The KINNEAR Manufacturing Company

Factories: 1780-1800 Fields Ave., Columbus 16, O.
1742 Yosemite Ave., San Francisco 24, Calif.
(Offices and Agents in all Principal Cities)

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

110 tons, water reservoir, Prairie du Chien, Wis.; Joseph J. Duffy Co., Chicago, low on general contract.

100 tons, Yakima county, Washington, hospital addition; Hall-Atwater Co., Seattle, general contract, $344,190.

PLATES . . .

PLATES PLACED

1100 tons, penstocks, spec. 1601, Kingman, Ariz., for U. S. Bureau of Reclamation, to Western Pipe & Steel Co. of California, San Francisco; bids Jan. 14.

180 tons, miscellaneous, Cont. No. 1, Northerly Island Airport, Chicago, for city, to Commercial Shearing & Stamping Co., Youngstown, O.; bids Feb. 13.

100 tons or more, steel water tank, Washington State College, Pullman, to Chicago Bridge & Iron Co., low $24,933, 305 days.

PLATES PENDING

Unstated, three penstocks, 851 x 8.5 feet, Mud Mountain dam; bids soon to U. S. engineer, Seattle.

Unstated tonnage, 300,000-gallon elevated steel water tank, veterans' hospital, Wilkes-Barre, Pa.

PIPE . . .

CAST IRON PIPE PLACED

100 tons, Washington State College, Pullman, to Pacific States Cast Iron Pipe Co., Provo, Utah.

100 tons, universal, for Kent, Wash., to Marckmann & Williams, Seattle.

CAST IRON PIPE PENDING

300 tons, 12 to 6-inch water and soil pipe; bids to Bureau of Reclamation, Coulee, Wash., Mar. 14 and 17, respectively.

100 tons or more, King county district No. 49, Seattle; bids Mar. 17.

STEEL PIPE PENDING

Unstated, 6000 feet, 30-inch steel water pipe, Salem, Oreg.; bids in.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National, 28 diesel-electric switch engines of 1000 horsepower, 18 to Electro Motive Division, General Motors Corp., La Grange, Ill., and 10 to American Locomotive Co., New York.

Chicago, Indianapolis & Louisville, 3 diesel-electric locomotives, with 2 going to Electro Motive Division, General Motors Corp., La Grange, Ill., and 1 to American Locomotive Co., New York.

RAILROAD CARS PLACED

Chicago, Indianapolis & Louisville, 100 seventy-ton hopper cars, to General American Transportation Corp., Chicago.

New York, New Haven & Hartford, 1000 steel box cars to Pullman-Standard Car Mfg. Co., Chicago, for construction at its Bay City, Mich., plant.

Southern Pacific, 500 flat cars, to American Car & Foundry Co., New York; 1000 sulphur cars, to own shops. This brings the company's recent total purchases up to 6200 cars, other awards against this list having been noted in previous issues.

RAILROAD CARS PENDING

Chicago, Rock Island & Pacific, 1000 fifty-ton steel sheathed box cars, bids asked.

Chicago & Northwestern, 1400 fifty-ton box cars, bids asked; 400 for its subsidiary, the Chicago, St. Paul, Minneapolis & Omaha.

Chicago, Indianapolis & Louisville, 400 freight cars, comprising 200 composite low-side gondolas and 200 fifty-ton steel box cars; bids asked.

Lehigh & New England, 100 seventy-ton covered hopper cars, bids closed Mar. 18.

CONSTRUCTION AND ENTERPRISE

IDAHO

LEWISTON, IDA.—Pacific Telephone & Telegraph Co. is building a $14,000 addition to its exchange here which will house equipment costing $138,000.

IOWA

CEDAR RAPIDS, IA.—Collins Radio Co. will soon award contracts for a 1-story factory addition, 300 x 275 ft. Cost will be $360,000.

GREENFIELD, IA.—Southwestern Federated Co-operative Inc. will spend $1,300,000 for construction of a 5500 kw generating plant, nine step-down substations and 175 miles of line.

WATERLOO, IA.—John Deere Tractor Co. has awarded general contract to Jens Olesen & Sons Construction Co. for 6-story gear manufacturing building, 275 x 120 ft. Cost is about $740,000.

KENTUCKY

FLOYD COUNTY, KY.—Chesapeake & Ohio Railway plans to build 22.5 miles of rail line to tap coal field in Floyd, Knott and Letcher counties.

MICHIGAN

BASELINE, MICH.—Aetna Industries Inc., 6791 E. Eight-Mile Rd., has been formed with a capital of $50,000 by Jerome Singer to manufacture tools and machinery.

BAY CITY, MICH.—Metal-Lite Products Co., 1101 S. Water St., has been formed by Albin Herek with a capital of $50,000 for a general manufacturing business.

DETROIT—Nicholl Steel Mfg. Co., 9352 Grinnell, has been formed with a capital of $50,000 by James A. Nicholl as a general manufacturing business.

DETROIT—Don Blackburn & Co., 1007 Holden Ave., has been formed with a capital of $50,000 by Don M. Blackburn to manufacture and sell electrical supplies and equipment.

DETROIT—Holcomb Industries Inc., 63 W. Milwaukee, has been formed with a capital of $100,000 by August A. Holcomb as a machine shop business.

DETROIT—Kayel Products Corp., 3000 Barlum Tower, has been formed by Harriet Weisberg with a capital of $50,000 to manufacture and sell industrial wheels.

DETROIT—Great Lakes Pattern Works Inc., 6441 Hastings Ave., has been formed by William G. Stenback with a capital of $50,000 to manufacture and sell patterns and foundry equipment.

DETROIT — Industrial Ceramics Inc., 2280 Penobscott Bldg., has been formed by Emil J. Banich with a capital of $50,000 as a general manufacturing business.

FLINT, MICH.—Franklin Screw Machine Co., 913 N. Franklin Ave., has been formed by George A. Giraud with a capital of $50,000 for a general manufacturing business.

JACKSON, MICH.—D. M. C. Supply Corp., 297 W. Michigan Ave., has been formed by Russell G. Mayo with a capital of $50,000 to manufacture and sell dies, gages, jigs and machinery.

KALAMAZOO, MICH.—Marten-Sutton Inc., 565 E. Michigan Ave., has been formed with a capital of $50,000 by Elmer L. Martens as a general machine shop.

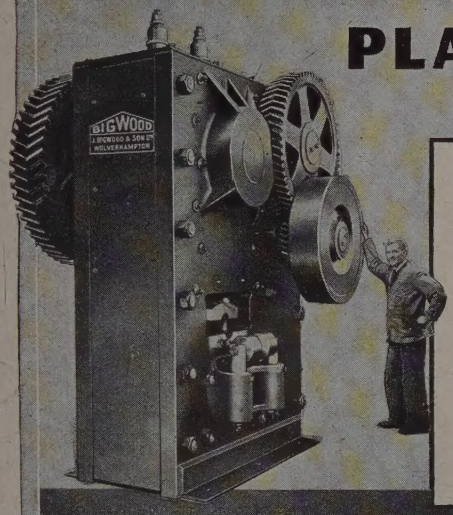
LANSING, MICH.—Chore Boy Milking Co., 819 E. Kalamazoo, has been formed by Harry DeLaere with a capital of $200,000 to manufacture and sell machinery, appliances and parts.

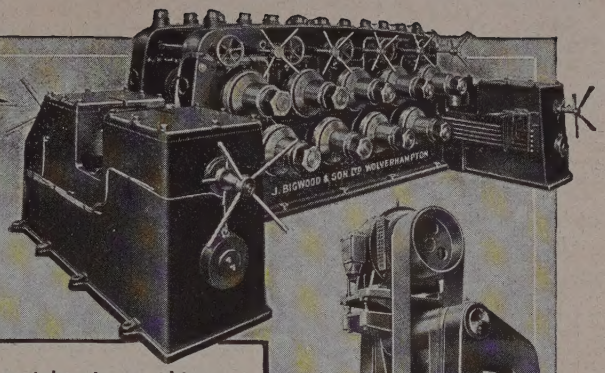
MARSHALL, MICH.—S. H. Leggitt Co., 327 High St., has been formed with a capital of $50,000 by S. H. Leggitt to manufacture and sell gas, electric and plumbing supplies.

MELVINDALE, MICH. — Whiting Tubular Products Inc., 17740 Clarann Ave., has been

BIGWOOD

STEEL WORKS PLANT





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MADE BY TOOLMAKERS
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MANSAVER GRABS

formed with a capital of $50,000 by Catherine M. Whiting to manufacture tube products.

WAYNE, MICH.—Trilex Corp., 42056 Michigan Ave., has been formed by John Airey Jr., with a capital of $50,000 to manufacture stampings and castings of metal.

MISSISSIPPI

BROOKHAVEN, MISS.—Mississippi Wood Preserving Co. will build a creosote plant costing $150,000.

GREENWOOD, MISS.—Delta Electric Power Association will spend $700,000 for system improvements and 403 miles of line.

GREENVILLE, MISS. — Tennessee Gas & Transmission Co. plans an expansion program costing $5,500,000. This would include doubling the firm's booster station near here and building an aerial pipeline bridge across the Mississippi river.

JACKSON, MISS.—South Mississippi Power Association, E. A. Ford, president, will build a $2 million power plant. Consulting engineers are Burns & McDonnell, 107 W. Linwood St., Kansas City, Mo.

MISSOURI

ST. LOUIS—Century Electric Co. will begin construction of a $1 million addition to its motor manufacturing plant.

NORTH CAROLINA

CHARLOTTE, N. C.—Baker Equipment Engineering Co. Inc. has let a contract to R. C. Hicks, Charlotte, for building to manufacture truck and bus bodies. Engineer is H. V. Biberstein, 1600 Elizabeth Ave.

ROCKY MOUNT, N. C.—V. B. Higgins Co., Greensboro, N. C., has a contract at $258,980 for city power plant improvements.

WINSTON-SALEM, N. C.—Western Electric Co. has acquired a 50-acre tract of land for proposed factory to house Winston-Salem Radio Shops.

OHIO

CLEVELAND—East Ohio Gas Co., 1405 E. 6th St., will spend $8,500,000 this year for additional facilities. Largest item will be extension of 20-in. pipe line from Canton, O., fields to Cleveland's west side. Contract has been let to Williams Bros., Tulsa, Okla.

CLEVELAND—Eaton Mfg. Co. will erect a $120,000 addition to its stamping division plant at 755 E. 140th St.

OREGON

EUGENE, ORE.—City water board has awarded a $132,845 contract to Allis-Chalmers Co. for a 225 rpm generator, and a turbine at $85,730 will be built by S. Morgan Smith Co. for the city's Leaburg power plant.

PENNSYLVANIA

NEW CASTLE, PA.—Johnson Bronze Co. will build a $600,000 addition, 110 x 400 ft, to its plant here. New facilities will be used for manufacture of bronze bearings.

SOUTH CAROLINA

SALUDA, S. C.—South Carolina Electric & Gas Co., Columbia, S. C., has plans under way for hydroelectric power plant, to cost $4 million.

TENNESSEE

ALCOA, TENN.—Aluminum Co. of America plans to construct a research laboratory to cost $243,000.

CHATTANOOGA, TENN. — Columbian Iron Works has instructed Ford, Bacon & Davis Inc., New York, architects and contractors, to stop all work on new foundry building to have cost about $275,000.

COLUMBIA, TENN.—Monsanto Chemical Co. plans an electric furnace to treat elemental phosphorus, at a cost of $235,000.

COLUMBIA, TENN.—City proposes to build intercepting sewers and extensions of the old system which will cost $1,066,530.

ELIZABETHTON, TENN.—Elizabethton Service Co. has let a contract to Armstrong Construction Co. for an office and shop building costing $84,000. Gill & Biancull, Chattanooga, Tenn., are the architects.

MEMPHIS, TENN.—Fischer Lime & Cement Co., Linden and Walnut Sts., suffered fire damage estimated at between $300,000 and $400,000.

MEMPHIS, TENN.—Dealers Tractor & Equipment Co., c/o Hulsey & Hall, architects, Sterick Bldg., plans construction of manufacturing plant, to cost $500,000.

TEXAS

HOUSTON, TEX.—National Steel Products Co. has purchased a 10-acre site for $163,500 at Lockwood and Armour Dr. here for a proposed $500,000 plant.

NEDERLAND, TEX.—Pure Oil Co. plans a $9 million expansion to its Smith's Bluffs refinery.

WEST VIRGINIA

CHARLESTON, W. VA.—United Fuel Gas Co. proposes to construct and operate additional facilities in West Virginia for delivery of natural gas. Estimated cost is $2,970,000.

FOLLANSBEE, W. VA.—Sheet Metal Specialty Division, Follansbee Steel Corp., Main and Penn Sts., has started construction of a $70,000 addition. Equipment totalling $60,000 has been ordered.

WEIRTON, W. VA.—Continental Can Co. Inc., 2510 Highland Ave., Cincinnati, plans construction of two can plants, which will be built close to the Irvin Works of Carnegie-Illinois Steel Corp. and the Weirton Steel Co.

CANADA

AMHERSTBURG, ONT.—S.K.D. Tool Co. Ltd., St. Arnaud St., has awarded a $40,000 contract to White Construction Co., 27 Park St. W., Windsor, Ont., for a plant.

OTTAWA, ONT.—International Harvester Co. of Canada Ltd., 208 Hollyard St., Hamilton, Ont., is having plans prepared by Hazelgrove, Lithwick & Cameron, architects, 53 Queen St., for construction of plant on Carling Ave. estimated to cost $500,000.

SARNIA, ONT.—Sun Oil Co. Ltd., Philadelphia, is having plans prepared for an oil refinery here estimated to cost $20 million.

SCARBOROUGH TOWNSHIP, ONT.—Metal Stampings Ltd., 3600 Danforth Ave., Toronto, will build a rolling mill plant here costing $500,000. Architects are Parrott, Tambling & Witmer, 57 Bloor St., Toronto.

TORONTO, ONT.—Standard Sanitaryware & Dominion Radiator Ltd., 800 Lansdowne Ave., has awarded a $100,000 contract for plant addition to Milne & Nicholls Ltd., 57 Bloor St. Architects are Prack & Prack, 36 James St., Hamilton, Ont.

TORONTO, ONT.—Dominion Wheel & Foundries Ltd., 171 Eastern Ave., plans construction of a $50,000 machine shop. Engineers are Redfern & Laughlin, 36 Toronto St.

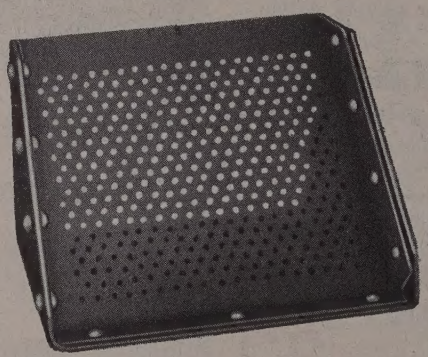
LACHINE, QUE.—Dominion Bridge Co. Ltd. has awarded a contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke St., Montreal, Que., for a plant addition costing $250,000.

MONTREAL, QUE.—Montreal Forged Products Ltd., 6900 Papineau Ave., plans construction of plant addition to cost $75,000.

MONTREAL, QUE.—Dominion Rubber Co. Ltd., 550 Papineau Ave., has awarded contract to Anglin Norcross Corp. Ltd., 892 Sherbrooke St., for a plant addition costing $300,000.

MONTREAL EAST, QUE.—McColl Frontenac Oil Co. Ltd., 360 St. James St., Montreal, has awarded contract to Canadian Kellog Co. Ltd., 34 Adelaid St. W., Toronto, Ont., for construction of addition to refinery here estimated to cost $15 million.

Typical of Hendrick's **Manufacturing Facilities**



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"Shur-Site" Treads and
Armorgrids